A PROSPECTIVE OBSERVATIONAL COHORT STUDY OF COMPLICATIONS AND OUTCOMES OF HAEMODIALYSIS VASCULAR ACCESSES.

A dissertation submitted to the Tamilnadu Dr. M.G.R. Medical University in the partial fulfillment of the University regulations for the award of D.M. (Branch - III) (Nephrology)

AUGUST 2015

BONAFIDE CERTIFICATE

This is to certify that the work presented in this dissertation titled **"A PROSPECTIVE OBSERVATIONAL STUDY OF COMPLICATIONS AND OUTCOMES OF HAEMODIALYSIS VASCULAR ACCESSES."** done towards the fulfillment of the requirements of the **Tamilnadu Dr. M.G.R Medical University, Chennai** for **the D.M (Branch - III) (Nephrology)** exams to be conducted in August 2015, is a bonafide work of the candidate **Dr. Bidhun Kuriakose Paulose,** Senior Post-graduate student in the Department of Nephrology, Christian Medical College, Vellore under my guidance and supervision. This dissertation has not been submitted, fully or in part to any other board or university.

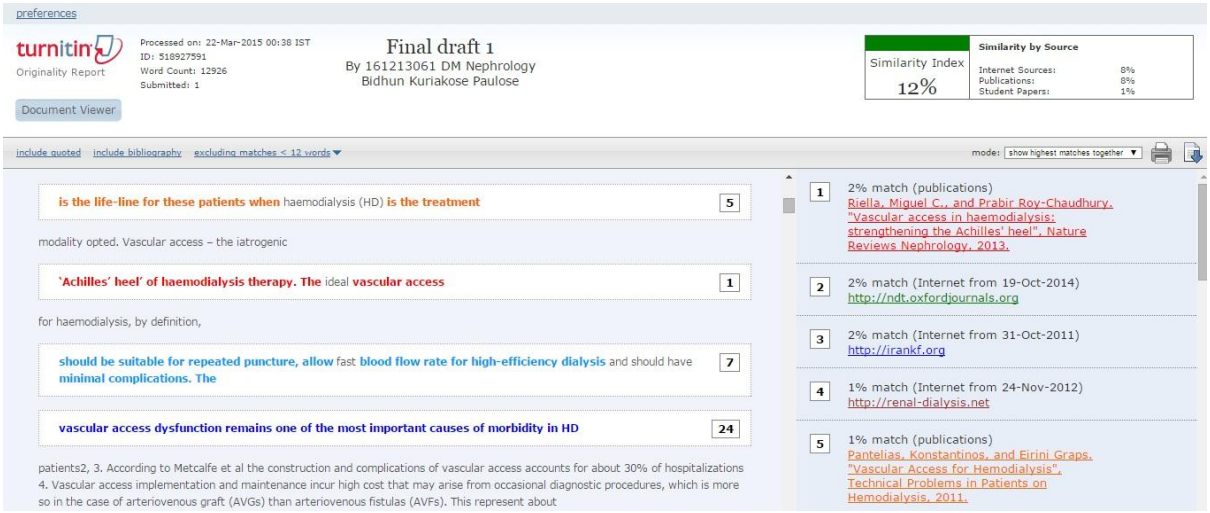
Guide & Head of Department

Dr. V. Tamilarasi M.D., D.C.H., D.M.
Professor and Head
Department of Nephrology
Christian Medical College
Vellore – 632004

DECLARATION

I, **Dr. Bidhun Kuriakose Paulose,** Senior Post-graduate student in the Department of Nephrology, Christian Medical College, Vellore, declare that the work presented in this dissertation titled **"A PROSPECTIVE OBSERVATIONAL STUDY OF COMPLICATIONS AND OUTCOMES OF HAEMODIALYSIS VASCULAR ACCESSES."** done towards the fulfillment of the requirements of the **Tamilnadu Dr. M.G.R Medical University, Chennai** for **the D.M (Branch - III) (Nephrology)** exams to be conducted in August 2015, is a bonafide work by myself, under the guidance of **Prof. Dr. V.Tamilarasi (Guide)**. This dissertation has not been submitted, fully or in part to any other board or university.

Dr. Bidhun Kuriakose Paulose
Senior Post-graduate Student
Department of Nephrology
Christian Medical College Vellore


preferences
turnitin
Originality Report
Processed on: 22-Mar-2015 00:38 IST
ID: 518927591
Word Count: 12926
Submitted: 1
Final draft 1
By 161213061 DM Nephrology
Bidhun Kuriakose Paulose
Similarity Index
12%
Similarity by Source
Internet Sources: 8%
Publications: 8%
Student Papers: 1%
Document Viewer
include quoted
include bibliography
excluding matches < 12 words
mode: show highest matches together
is the life-line for these patients when haemodialysis (HD) is the treatment 5
modality opted. Vascular access – the iatrogenic
'Achilles' heel' of haemodialysis therapy. The ideal vascular access 1
for haemodialysis, by definition,
should be suitable for repeated puncture, allow fast blood flow rate for high-efficiency dialysis and should have minimal complications. The 7
vascular access dysfunction remains one of the most important causes of morbidity in HD 24
patients2, 3. According to Metcalfe et al the construction and complications of vascular access accounts for about 30% of hospitalizations 4. Vascular access implementation and maintenance incur high cost that may arise from occasional diagnostic procedures, which is more so in the case of arteriovenous graft (AVGs) than arteriovenous fistulas (AVFs). This represent about
1 2% match (publications) Riella, Miguel C., and Prabir Roy-Chaudhury. "Vascular access in haemodialysis: strengthening the Achilles' heel", Nature Reviews Nephrology, 2013.
2 2% match (Internet from 19-Oct-2014) http://ndt.oxfordjournals.org
3 2% match (Internet from 31-Oct-2011) http://irankf.org
4 1% match (Internet from 24-Nov-2012) http://renal-dialysis.net
5 1% match (publications) Pantelias, Konstantinos, and Eirini Graps. "Vascular Access for Hemodialysis", Technical Problems in Patients on Hemodialysis, 2011.

OFFICE OF RESEARCH
INSTITUTIONAL REVIEW BOARD (IRB)
CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA.

Dr. B.J. Prashantham, M.A., M.A., Dr. Min (Clinical)
Director, Christian Counseling Center,
Chairperson, Ethics Committee.

Dr. Alfred Job Daniel, D Ortho, MS Ortho, DNB Ortho
Chairperson, Research Committee & Principal

Dr. Nihal Thomas,
MD., MNAMS., DNB (Endo), FRACP (Endo), FRCP (Edin), FRCP (Glasg)
Deputy Chairperson
Secretary, Ethics Committee, IRB
Additional Vice Principal (Research)

February 18, 2014

Dr. Bidhun Kuriakose Paulose
Senior PG Registrar
Department of Nephrology
Christian Medical College
Vellore 632 004

Sub: **Fluid Research grant project:**
Morbidity and mortality among incident and prevalent adult maintenance hemodialysis patients – a one year prospective observational study.
Dr. Bidhun Kuriakose Paulose, Nephrology, Dr. V. Tamilarasi, Nephrology, Dr. Shibu Jacob, Dr. Sureena Alexander, Dr. Anna T Valson, Dr. Santhosh Varughese, Mr. Palani-K, Dialysis Therapist, Nephrology.

Ref: IRB Min. No: 8554 [OBSERVE] dated 27.11.2013

Dear Dr. Bidhun Kuriakose Paulose,

I enclose the following documents:-

1. Institutional Review Board approval 2. Agreement

Could you please sign the agreement and send it to Dr. Nihal Thomas, Addl. Vice Principal (Research), so that the grant money can be released.

With best wishes,

Dr. NIHAL THOMAS
MD, MNAMS, DNB(Endo), FRACP(Endo), FRCP(Edin), FRCP(Glasg)
SECRETARY - (ETHICS COMMITTEE)
Institutional Review Board,
Christian Medical College, Vellore - 632 002.

Dr. Nihal Thomas
Secretary (Ethics Committee)
Institutional Review Board

Cc: Dr. V. Tamilarasi, Nephrology, CMC

OFFICE OF RESEARCH
INSTITUTIONAL REVIEW BOARD (IRB)
CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA.

Dr. B.J. Prashantham, M.A., M.A., Dr. Min (Clinical)
Director, Christian Counseling Center.
Chairperson, Ethics Committee.

Dr. Alfred Job Daniel, D Ortho, MS Ortho, DNB Ortho
Chairperson, Research Committee & Principal

Dr. Nihal Thomas,
MD., MNAMS., DNB (Endo), FRACP (Endo), FRCP (Edin), FRCP (Glasg)
Deputy Chairperson
Secretary, Ethics Committee, IRB
Additional Vice Principal (Research)

February 18, 2014

Dr. Bidhun Kuriakose Paulose
Senior PG Registrar
Department of Nephrology
Christian Medical College
Vellore 632 004

Sub: **Fluid Research grant project:**
Morbidity and mortality among incident and prevalent adult maintenance hemodialysis patients – a one year prospective observational study.
Dr. Bidhun Kuriakose Paulose, Nephrology, Dr. V. Tamilarasi, Nephrology, Dr. Shibu Jacob, Dr. Suceena Alexander, Dr. Anna T Valson, Dr. Santhosh Varughese, Mr. Palani R, Dialysis Therapist, Nephrology.

Ref: IRB Min No: 8554 [OBSERVE] dated 27.11.2013

Dear Dr. Bidhun Kuriakose Paulose,

The Institutional Review Board (Silver, Research and Ethics Committee) of the Christian Medical College, Vellore, reviewed and discussed your project titled "Morbidity and mortality among incident and prevalent adult maintenance hemodialysis patients – a one year prospective observational study." on November 27th, 2013.

The Committee reviewed the following documents:

1. IRB application format
2. Curriculum Vitae' of Dr. Bidhun Kuriakose Paulose, Dr. V Tamilarasi, Dr. Shibu Jacob, Dr. Suceena Alexander, Dr. Anna T Valson, Dr. Santhosh Varughese, Mr. Palani R
3. Information Sheet (English, Tamil Hindi & Bengali)
4. Study work sheet
5. No of documents 1-4

Dr. B.J. Prabhantham, M.A., M.A., Dr. Min (Clinical)
Director, Christian Counseling Center,
Chairperson, Ethics Committee.

Dr. Alfred Job Daniel, D Ortho, MS Ortho, DNB Ortho
Chairperson, Research Committee & Principal

Dr. Nihal Thomas,
MD., MNAMS., DNB (Endo), FRACP (Endo), FRCP (Edin), FRCP (Glasg)
Deputy Chairperson
Secretary, Ethics Committee, IRB
Additional Vice Principal (Research)

The following Institutional Review Board (Research & Ethics Committee) members were present at the meeting held on November 27th, 2013at 9.45 am in the CREST/SACN Conference Room, Christian Medical College, Bagayam, Vellore 632002.

Name	Qualification	Designation	Other Affiliations
Dr. B. Poonkuzhali	MSC, PhD	Professor, Haematology, CMCH.	Internal, Basic Medical Scientist
Dr. Asha Mary Abraham	MBBS, MD, PhD	Professor, Virology, CMCH.	Internal, Clinician
Dr. Molly Jacob	MBBS, MD, PhD	Professor, Biochemistry, CMCH.	Internal, Clinician
Dr. Biju George	MBBS, MD, DM	Professor, Haematology,CMCH.	Internal, Clinician
Dr. Vinod Joseph Abraham	MBBS, MD, MPH	Professor, Community Medicine, CMCH.	Internal, Clinician
Dr. Sukriya Nayak	MBBS, MS	Professor, General Surgery, CMCH	Internal, Clinician
Dr. Deepak Abraham	MBBS, MS	Professor, Endocrine Surgery, CMCH.	Internal, Clinician
Dr. Suresh Devasahayam	BE, MS, PhD	Professor of Bio-Engineering, CMCH.	Internal, Basic Medical Scientist
Dr. B. Antonisamy	M.Sc, PhD, FSMS, FRSS	Professor, Biostatistics, CMCH. Member Secretary, Research Committee, IRB.	Internal, Statistician

Dr. B.J. Prashantham, M.A., M.A., Dr. Min (Clinical)
Director, Christian Counseling Center,
Chairperson, Ethics Committee.

Dr. Alfred Job Daniel, D Ortho, MS Ortho. DNB Ortho
Chairperson, Research Committee & Principal

Dr. Nihal Thomas,
MD., MNAMS., DNB (Endo), FRACP (Endo), FRCP (Edin), FRCP (Glasg)
Deputy Chairperson
Secretary, Ethics Committee, IRB
Additional Vice Principal (Research)

Dr. Thambu David	MBBS, MD, DNB	Professor & Head, Medicine, CMCH.	Internal, Clinician
Dr. I. Jeyaseelan,	M. Sc, PhD, FRSS	Professor, Biostatistics, CMCH.	Internal, Statistician
Prof. Keith Gomez	B Sc, MA (S.W), M. Phil (Psychiatry Social Work)	Student counselor, Loyola College, Chennai, Deputy Chairperson, Ethics Committee, IRB	External, Lay Person & Social Scientist
Mrs. Pattabiraman	B. Sc, DSSA	Social Worker. Vellore	External, Lay person
Mr. C. Sampath	B. Sc, BL.	Legal Expert, Vellore	External, Legal Expert
Dr. P. Zachariah	MBBS, PhD	Retired Professor, Vellore	External, Scientist
Rev. Dr. T. Arul Dhas	M.Sc, BD, DPC, PhD [Edin]	Chaplaincy Department, CMCH.	Internal, Social Scientist
Dr. Binu Susan Mathew	MBBS, MD.	Associate Professor, Clinical Pharmacology CMCH.	Internal, Pharmacologist
Mrs. Mary Johnson	M.Sc	Professor, Child Health Nursing	Internal, Nurse
Mr. Samuel Abraham	MA, PGDBA, PGDPM, M. Phil, BL.	Sr. Legal Officer, CMCH.	Internal, Legal Expert
Dr. George Thomas	MBBS, D Ortho, Ph. D	Orthopaedic Surgeon, St. Isabella Hospital, Chennai, Chairperson, Ethics Committee, IRB.	External, Clinician

OFFICE OF RESEARCH
INSTITUTIONAL REVIEW BOARD (IRB)
CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA.

Dr. B.J. Prashanthan, M.A., M.A., Dr. Min (Clinical)
Director, Christian Counseling Center,
Chairperson, Ethics Committee.

Dr. Alfred Job Daniel, D Ortho, MS Ortho, DNB Ortho
Chairperson, Research Committee & Principal

Dr. Nihal Thomas,
MD., MNAMS., DNB (Endo), FRACP (Endo), FRCP (Edin), FRCP (Glasg)
Deputy Chairperson
Secretary, Ethics Committee, IRB
Additional Vice Principal (Research)

Dr. Nihal Thomas	MD MNAMS DNB(Endo) FRACP(Endo) FRCP(Edin) FRCP (Glasg)	Secretary IRB (EC)& Dy. Chairperson (IRB), Prof. of Endocrinology & Addl. Vice Principal(Research), CMC	Internal, Clinician

Hence we approve the project to be conducted as presented.

The Institutional Ethics Committee expects to be informed about the progress of the project, any **adverse events** occurring in the course of the project, any **amendments** in the **protocol and the patient information / informed consent**. On completion of the study you are expected to submit a copy of the **final report**. Respective forms can be downloaded from the following link: http://172.16.11.136/Research/IRB_Policies.html in the CMC Intranet and in the CMC website link address: http://www.cmch-vellore.edu/static/research/Index.html.

Fluid Grant Allocation:

A sum of 7,000 INR (Rupees Seven Thousand only) will be granted for 16 months

Yours sincerely

Dr. Nihal Thomas
Secretary (Ethics Committee)
Institutional Review Board

DR. NIHAL THOMAS
MD, MNAMS, DNB(Endo), FRACP(Endo), FRCP(Edin) FRCP(Glasg)
SECRETARY - (ETHICS COMMITTEE)
Institutional Review Board,
Christian Medical College, Vellore - 632 002.

Cc: Dr. V. Tamilarasi, Nephrology, CMC

IRB Min No: 8554 [OBSERVE] dated 27.11.2013

5 of 5

ACKNOWLEDGEMENT

First and foremost, I am grateful to **GOD** for his abundant grace that has sustained me throughout and blessed the work of my hands.

I express my gratitude and respect to my teacher and guide, **Dr. V Tamilarasi** for her guidance and encouragement.

I express my sincere gratitude to **Dr. Shibu Jacob** for his guidance, personal involvement and timely assistance at each point of time during the study.

I express my sincere thanks to **Dr. Suceena Alexander**, **Dr. Santosh Varughese** and **Dr. Anna T Valson** for invaluable suggestions and continual revisions. I thank **Mr. Brijesh Yadav** (Clinical Epidemiology Unit - CEU) for teaching me the basics of biostatistics and **Dr.Suceena Alexander** for her help with subsequent analyses.

I express my sincere thanks to **Mr. R. Palani**, **Ms. Mercy Nahomi Deborah** and **Ms. R.B. Maria Shirley** for logistical help regarding some data collection and phone calls. I am indebted to all the **patients and relatives** who were involved in the study, without whom, this would not have been possible.

I owe my greatest debt of gratitude to my wife **Dr. Divya** and my children **Paul and Sreya** for their constant love, trust and support.

TABLE OF CONTENTS

21	1 year survival of the distal vs. proximal AVFs in incident patients	66
22	1 year survival of AVFs in diabetic vs. non-diabetic prevalent patients	68
23	Survival of Non-Tunnelled DialysisCatheters	73

Abbrevations

ACL - Antibacterial Catheter Locks

AV access - Arterio-Venous access

AVF - Arterio-Venous Fistula

AVG - Arterio-Venous Graft

CVC - Central Venous Catheters

CRBSI - Catheter Related Blood Stream Infection

DBI - Digital-to-Brachial pressure Index

DP - Digital Pressure

DRIL - Distal Revascularization and Interval Ligation

HD - Haemodialysis

KDOQI - Kidney Disease Outcomes Quality Initiative

NKF - National Kidney Foundation

PTFE - Poly TetraFluroEthylene

RCT - Randomized Controlled Trials

RRT - Renal Replacement Therapy

TDC - Tunnelled Dialysis Catheter

INTRODUCTION

The management of advanced chronic kidney disease requires seamless integration of the available modalities of renal replacement therapy (RRT) namely, maintenance haemodialysis, peritoneal dialysis and renal transplant. The prevalent patients on RRT are steadily increasing worldwide and India is no exception. Haemodialysis remains the most common form of RRT[1]. Vascular access for haemodialysis is the life-line for these patients when haemodialysis (HD) is the treatment modality opted.

Vascular access – the iatrogenic 'Achilles' heel' of haemodialysis therapy.

The ideal vascular access for haemodialysis (HD), by definition, should be suitable for repeated puncture, allow fast blood flow rate for high-efficiency dialysis and should have minimal complications. The vascular access dysfunction remains one of the most important causes of morbidity in HD patients[2, 3]. According to Metcalfe et al the construction and complications of vascular access accounts for about 30% of hospitalizations [4]. Vascular access implementation and maintenance incur high cost that may arise from occasional diagnostic procedures, which is more so in the case of arteriovenous graft (AVGs) than arteriovenous fistulas (AVFs). This represent about 14–20% of total health care costs for haemodialysis patients [5, 6.] Nevertheless, various studies have proven, timely creation of AVFs reduced the mortality rate by 1.72 times[7]. Therefore, a successful creation of permanent vascular access and the appropriate management to decrease the complications is mandatory for better

survival of the patients and also to keep the costs involved to a minimum. A good functional access is also vital in order to deliver adequate dialysis dose to patients with end stage renal disease.

The native AVF originally described by Brescia and Cimino in 1966 still remains the first choice for vascular access even though various other modalities and technique improvements have been introduced like polytetrafluroethylene (PTFE) grafts, tunnelled dialysis catheters (TDCs) and a plethora of balloons and stents could be considered as substantial progress in the field of HD. Native AVFs are currently the preferred access for haemodialysis as they are associated with the lowest risk of complications, the lowest need for intervention, and the best long term patency. However, no randomized controlled trials have compared access types in these regard.

The proportion of patients starting haemodialysis with a native AVF varies considerably around the world. The highest incident and prevalent rates for AVFs are in Japan and Germany and the lowest levels in the USA[8]. The Fistula First Initiative, instituted in 2004 by the Centers for Medicare and Medicaid Services (CMS) and the National Kidney Foundation (NKF) [9], however, resulted in a rapid increase in the AVF prevalence rate from 24% in 1999[10] to over 60% in April 2012, indicating that a quality and process of care improvement program can completely change the way medicine is practiced. However, the trend in India is yet to reverse, with most publications showing only 15-29% of patients[11, 12] starting HD with native AVFs, which underlines the huge *knowledge, action and practice gap* in India with respect to vascular access for HD.

AIMS

To study complications and outcomes of haemodialysis vascular accesses for one year at AK Lab (dialysis unit), Christian Medical College, Vellore.

OBJECTIVES

1. To study the profile of vascular access utilization among the maintenance hemodialysis patients.
2. To study the vascular access complications in these patients for a duration of 1 year.
3. To look for the possible difference between the pattern of complications among the incident and prevalent hemodialysis patients and compare with that of the published literature.

LITERATURE REVIEW

A brief history of vascular access for haemodialysis

The beginning the experiments in vascular anastomosis were done by Jaboulay and Briau (Lyon, France) in dogs in 1896[13]. A few years later, Alexis Carrel (USA, Nobel Prize winner, 1912) had pioneered the three-point end-to-end and a side-to-side vascular anastomosis, a technique used even today[14].

In 1924, Georg Haas (Germany) performed the first haemodialysis treatment in humans. He used glass cannulae to access arterial blood and returned it back to the cubital vein. Initially hirudin preparations were used as the anticoagulant and later it was replaced with Heparin which avoided the severe allergic reactions that occurred with hirudin. He had performed a total of eleven haemodialysis treatment each lasting for about fifteen minutes. Since 1929, the treatment was discontinued presumably because of the lack of recognition by his peers and the limited efficacy.

In 1943, Willem Kolff (The Netherland) started off the voyage of modern haemodialysis therapy by treating a 29 year old lady suffering from presumably chronic kidney disease. He devised the 'rotating drum kidney' with help of local non-medical entrepreneur. Kolff initially used venipuncture needles and later on surgical cutdown of the radial artery was employed. Occasionally heavy bleeding ensued after heparinization. On 11 September 1945 the first of his 17 patients survived who was 67 year old lady with cholecystitis and presumably sulphonamide induced nephrotoxicity.

In the 1950s, the technical devices were available for regular haemodialysis treatments[15], like Kolff's so-called 'twin-coil kidney' However reliable access to circulation for repeated use limited the success of the technical advancement.

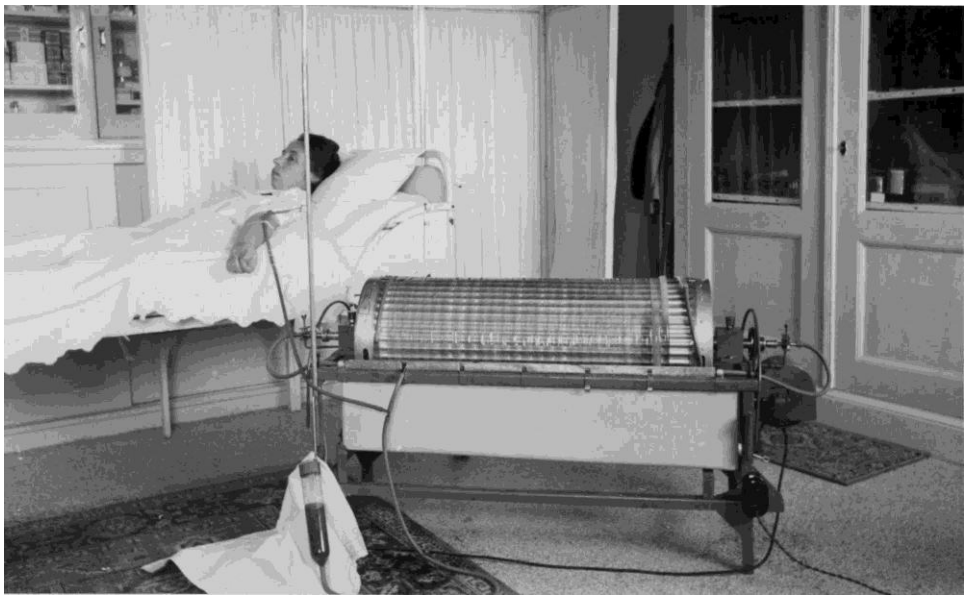


Figure 1: Patient undergoing haemodialysis using Kolff's 'rotating drum kidney'

The next major development was use of arteriovenous Teflon shunt by Quinton, Scribner (USA) and Dillard. In 1960 Scribner published the landmark paper 'Preliminary report on the treatment of chronic uremia by means of intermittent haemodialysis after having successfully initiated his first patient on Teflon AVF shunt.

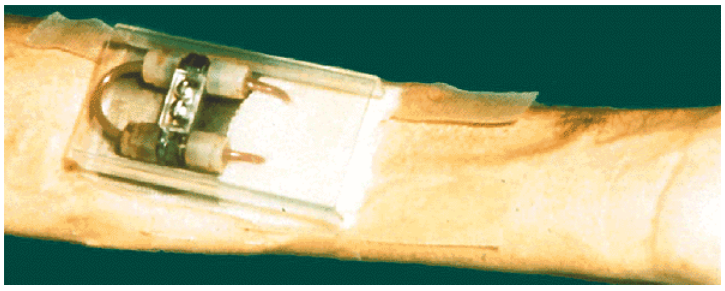


Figure 2: Patient's forearm with Scribner shunt

Scribner's first patient, Clyde Shields, a Boeing machinist, survived eleven years after the AV shunt insertion. Later silicon rubber tubings replaced the Teflon cannulae. This event is rightly considered a landmark in the history of dialysis and maintenance haemodialysis therapy began since then.

Another pioneer Stanley Shaldon (London), used handmade catheters (introduced by percutaneous Seldinger technique) for emergent access of femoral artery and femoral vein for dialysis in 1961. Subsequently techniques were developed to cannulate vessels in different location including subclavian vein. Shaldon used regional heparinization hexadimethrine bromide ('Polybrene') to prevent the side effect of massive bleed associated with systemic heparinization. These unique catheters devised by Shaldon are now known by the name 'Shaldon catheters'[16, 17].

In 1966, Brescia, Cimino, Appell and Hurwich published the landmark paper 'Chronic haemodialysis using venipuncture and a surgically created arteriovenous fistula' in New England Journal of Medicine. Appell, who was the surgeon in the team created the first arteriovenous fistula for haemodialysis in 19th February 1965. Appell performed side to side anastomosis at the wrist between radial artery and cephalic vein after a 3–5 mm incision had been made in the corresponding lateral surfaces of the artery and the vein.

In 1967, C.T.Dotters et al, devised a balloon catheter which could be used for the recanalization of the obstructed arteries due to causes like atherosclerotic plaques or stenosis. This was the first reported instance of angioplasty being employed to resolve vascular stenosis[18].

In 1969, Josef Erben (former Czechoslovakia) pioneered the infra-clavicular approach to subclavian route of vascular access originally introduced by Shaldon in 1961[19]. In the following two decades it remained the preferred temporary route for vascular access by central venous catheterization. In the present scenario the subclavian route has been nearly abandoned due to high incidences of complications like stenosis or occlusion (up to 50% in certain series[20]) resulting in limb edema.

The early works on vascular graft for haemodialysis are done by George I Thomas (USA) using Dacron patches known as 'Dacron appliqué shunt' and Gilberto Flores Izquierdo (Mexico City) and James May (Australia) using autologous saphenous veins. The initial usage of graft was met with limited success due to technical challenges and lack of good prosthetic materials. In 1972, three new graft materials were introduced. The first was a xeno-graft, the modified bovine carotid artery biologic graft, pioneered by J.L. Chinitz (USA) [21] received some acceptance. The second was a Dacron velour vascular graft for creation of AV bridge grafts by I. Dunn (USA) [22] which was not well accepted as subsequent studies didn't yield satisfactory results for vascular access. The third was expanded polytetrafluroethylene (ePTFE) pioneered by, L.D. Baker Jr (USA) [23]. ePTFE remains the first choice of grafts even today. The acceptance of ePTFE over Dacron was because it met many criteria for ideal graft material for haemodialysis vascular access,

- safety and ease of handling during the operation
- no formation of aneurysms after repeated cannulation
- low infection rates are required

- easy surgical replacement of graft segments in cases of infected and aneurysmatic grafts

Another surgical advancement was by Jose´ R. Polo (Spain) [24], who introduced the concept of 'brachial-jugular polytetrafluroethylene fistulas for haemodialysis' for patients who have exhausted vascular access options in both arms or stenosis along subclavian vein resistant to intervention. Here a graft vein anastomosis using internal jugular vein can be used in an exceptional instance.

Digital subtraction angiography (DSA) was introduced by D.L.Ergun (USA). Later this technique was adapted into the management of vascular access dysfunction in the form of fistulogram using the arterial as well as the venous route to visualize AV fistulas and prosthetic bridge grafts[25].

In a landmark article Barbara Nonnast-Daniel (Germany) [26] on 'Colour doppler ultrasound assessment of arteriovenous haemodialysis fistulas' brought in the usage of colour doppler into the armamentarium of vascular surgeons and nephrologists. Doppler was used to obtain anatomic and functional parameters, which were not only helpful to guide the surgeon for optimizing the first access operation, but also handy for monitoring and surveillance of the access function during follow-up.

Classification of vascular accesses used for haemodialysis

The need for vascular access in patients with renal failure can be temporary or permanent. The necessity for temporary access may vary from several hours (single dialysis) to a few months (if used to dialyze while waiting for an arteriovenous [AV] fistula to mature). Temporary access is established by the percutaneous insertion of a

catheter into a large vein (internal jugular, femoral, or, less desirable, subclavian). Construction of a permanent vascular access permits repeated angioaccess for months to years.

The vascular access for haemodialysis can be classified as,

1. Venous Catheter Access (Temporary Haemodialysis Access)
    a. Non-tunnelled Dialysis Catheter (NTDC) - for short term use
    b. Tunnelled Dialysis Catheter (TDC) - for long term use and,
2. Arteriovenous Access (Permanent Haemodialysis Access)
    a. Arteriovenous fistula (AVF) - autologous access
    b. Arteriovenous graft (AVG) - prosthetic access

VENOUS CATHETER ACCESS FOR HAEMODIALYSIS

Indications for venous catheter access are

1. Short term indications for acute angioaccess
    a. those with acute renal failure;
    b. those requiring haemodialysis or haemoperfusion for overdose or intoxication;

c. those with end-stage renal failure needing urgent haemodialysis but without available mature access;

d. those on maintenance haemodialysis who have lost effective use of their permanent access and require temporary access until permanent access function can be re-established;

e. patients requiring plasmapheresis;

f. peritoneal dialysis patients whose abdomens are being rested prior to new peritoneal catheter placement (usually for severe peritonitis that required peritoneal dialysis catheter removal); and

g. transplant recipients needing temporary haemodialysis during severe rejection episodes.

2. Long term indications for angioaccess in whom AV access cannot be created

a. children,

b. diabetic patients with severe vascular disease,

c. patients who are morbidly obese,

d. patients who have undergone multiple AV access insertions and in whom additional sites for AV access insertion are not available.

e. Additionally, patients with cardiomyopathy unable to sustain adequate blood pressures or access flows can also be considered.

Venous catheter types and design

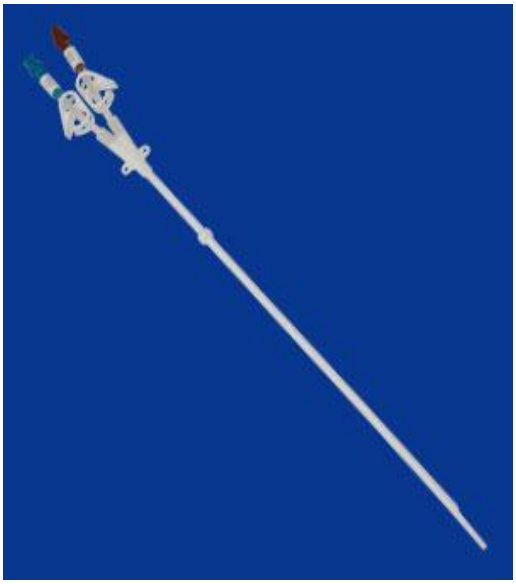
- Cuffed versus uncuffed. Use of an uncuffed catheter for periods of time beyond several weeks results in a relatively high rate of infection and is not recommended. Dacron or felt cuffs bonded to the catheter reduce the incidence of line-related infection and of catheter migration and must be used whenever a longer-term use of the catheter is anticipated, or when it is anticipated that a patient will be discharged from the hospital with a catheter remaining in place.

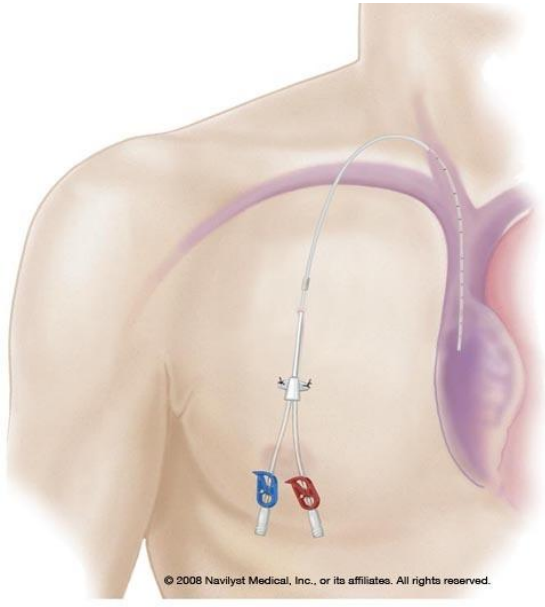
Figure 3: Non Tunnelled Dialysis Catheters for Internal Jugular vein

Figure 4: Non Tunnelled Dialysis Catheters for Femoral vein

Figure 5: Patient undergoing dialysis with Non Tunnelled Jugular catheter.

Figure 6: Tunnelled Dialysis Catheter





- Design issues. Dual-lumen venous catheters are available in a ‘double-D’ • configuration or where the two lumens are in some related, side-by-side configuration. Coaxial catheters are now less frequently used. A side-by-side port design permits the intravenous portion of the catheter to be split into two parts close to the termination point. This results in a softer, more pliable catheter end, a greater separation of inlet and outlet ports, and perhaps a lower recirculation rate.

  A new palindrome symmetrical tip configuration (Philibert et al., 2005)[27] has been reported to greatly reduce or eliminate recirculation when the normal flow through the catheter is reversed (line reversal is sometimes required as a stop-gap measure when using dysfunctional catheters). The Tesio catheter system consists of two completely separate catheters, one for inflow and one for outflow. One touted advantage of the Tesio catheters is that they are made of softer, silicone material.

- Antiseptic impregnation. Venous catheters for non-dialysis use have been impregnated with antiseptic or silver-based coatings in an attempt to inhibit bacterial growth and infection rate, and some studies show success with this approach. Sometimes the cuff alone is impregnated with such material. Randomised controlled trials using such antiseptic-bonded catheters for dialysis that demonstrate improved outcomes are awaited.

Insertion location and technique

The optimal insertion site is the right internal jugular vein. The subclavian site should generally be avoided because it is associated with a higher incidence of insertion-related complications (pneumothorax, hemothorax, subclavian artery perforation, brachial plexus injury) and, more importantly, a higher incidence (up to 50%) of central venous stenosis. Catheterization of the femoral vein is a good choice when the need for haemodialysis (or haemoperfusion or plasmapheresis) is expected to be short (<1 week).

The femoral approach is useful for performing the initial haemodialysis treatment in patients who present with acute pulmonary edema because the patient's head and chest can be elevated during insertion. Although some have used cuffed femoral catheters in ambulatory patients (usually when few or no other access option is easily available), this is not recommended, and almost all femoral catheters used are inserted into hospitalized, bedridden patients. When femoral catheters are used, the length must be sufficiently long (usually at least 20 cm) so that the tip is in the inferior vena cava to permit better flow and to minimize recirculation. The preferred order of catheterization is internal jugular site > femoral site > subclavian site. Subclavian route should be used only in instance of acute angioaccess where there are contraindications to access internal jugular and femoral sites.

The venous catheters can be inserted under strict aseptic precautions by the surface marking method (also known as the blind method) or under ultrasound guidance. The use of real time ultrasound guidance has been proven to reduce the incidence of catheter insertion related complications at various anatomical sites.

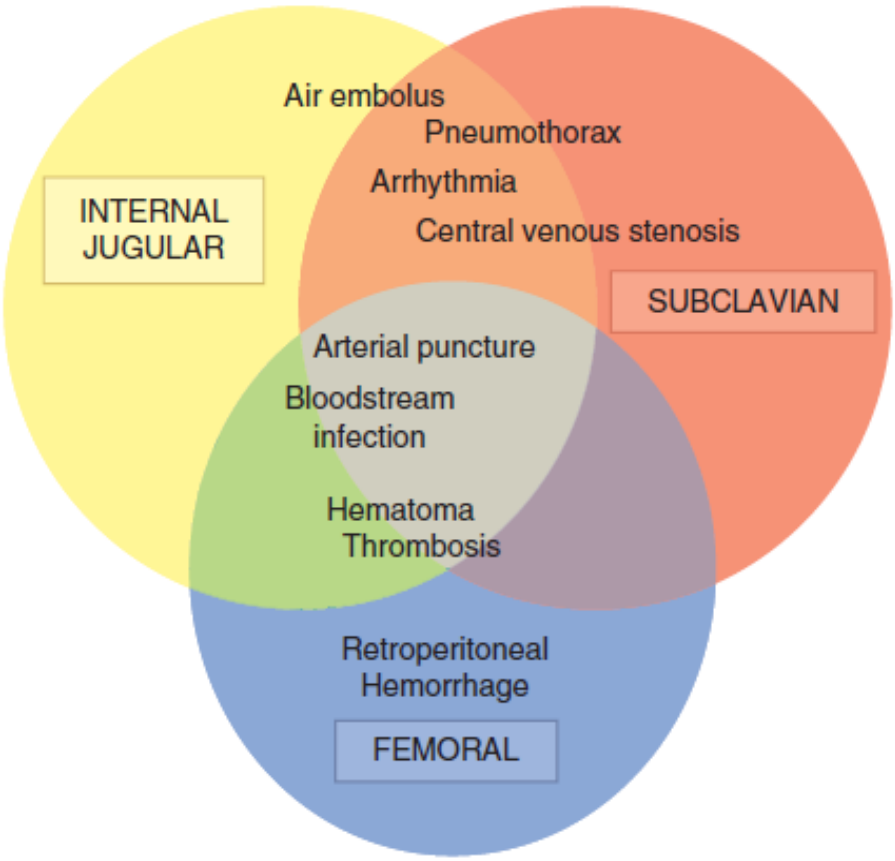


Figure 7: Complications of non-tunnelled haemodialysis catheter insertion[28]

Mechanical complications like vascular injury or hematoma formation is reported to occur in up to 5% of cases[29]. Though the other of the catheter insertion related complications like air embolism, pneumo-thorax are rare, they can be potentially fatal. The success of the USG guidance is mainly due the anatomical variation of relative locations of vein to the artery. The use of ultrasound-guidance in catheter insertion was found beneficial in Internal Jugular catheterization in reducing the time taken and first attempt success. In an RCT, the ultrasound-guidance has shown benefit in femoral catheterizations as well[30, 31].

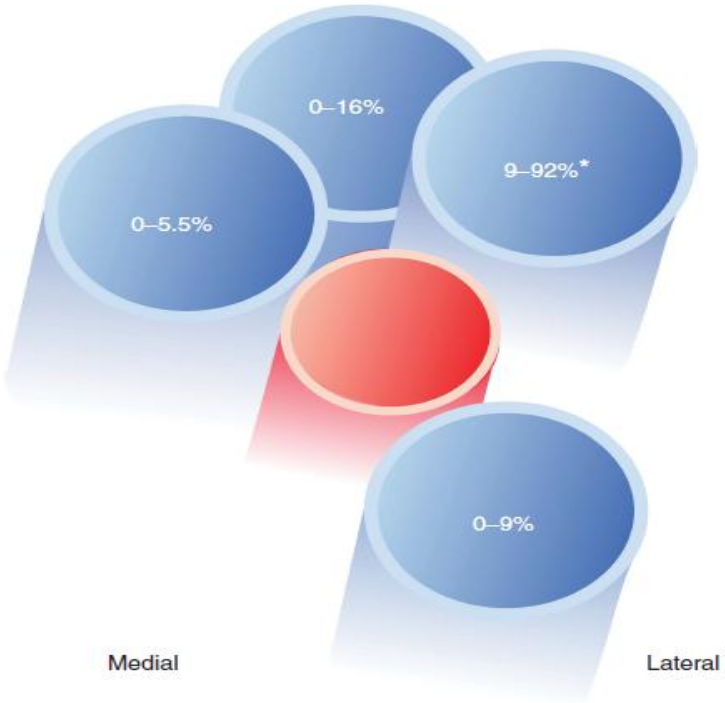


Figure 8: Right-sided, axial section view of the internal jugular vein relative to the common carotid artery showing the anatomic variation[28].

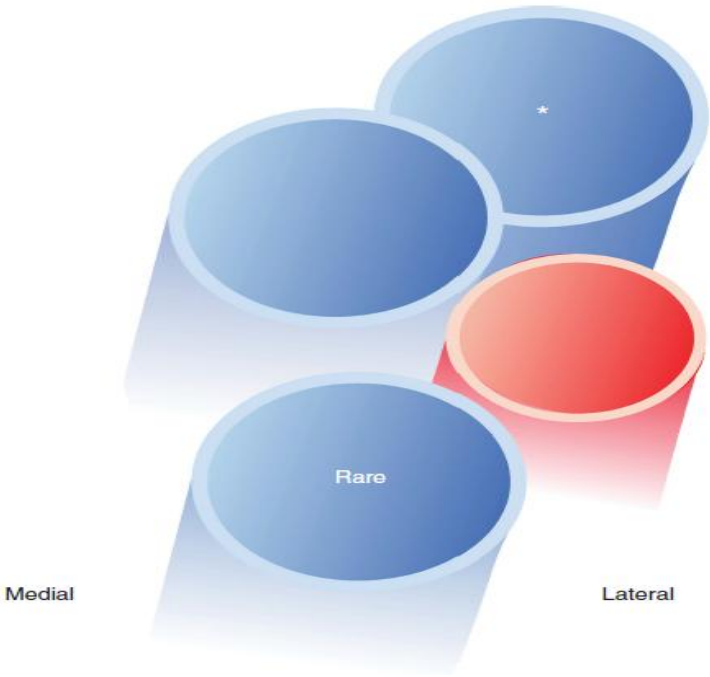


Figure 9: Right-sided, axial section of the common femoral vein relative to the common femoral artery showing the anatomic variation[28].

Table 1: Complications of venous dialysis catheters

Immediate complications	Arterial puncture Pneumo/ Haemothorax Air embolism Cardiac arrhythmias Perforation of vein or cardiac chamber Pericardial tamponade
Late complications	Infection Thrombosis Arteriovenous fistula Central venous stricture
Injury to adjacent structures	Brachial plexus injury Retroperitoneal hematoma in femoral catheters Tracheal injury Recurrent laryngeal nerve palsy

The complications other that infection, thrombosis and central stenosis are rare. Infection is the leading cause of the catheter loss and increases the morbidity and mortality markedly. Infection may arise from the migration of the patient's own skin flora through the puncture site and onto the outer catheter surface. More frequently, infection may result from contamination of the catheter connectors, lumen contamination during dialysis, or infused solutions. Catheters can also become

colonized from more remote sites during bacteremia. Gram-positive bacteria (usually Staphylococcus species) are the most common culprits.

Infections in Non Tunnelled Dialysis Catheter are,

- Localized exit site infection. If there is erythema and/or crust but no purulent discharge, one can usually treat with appropriate antibiotics for up to 2 weeks. The catheter must be removed if systemic signs of infection develop (leukocytosis or temperature >38°C), if pus can be expressed from the tract of the catheter, or if the infection persists or recurs after an initial course of antibiotics. If blood cultures are positive, then the catheter should be removed.

- Systemic infection. The initial presentation is typically with fever and leukocytosis. The degree of fever may increase during dialysis, and this is not necessarily a sign of pyrogenic reaction. Signs of exit site infection are common but on occasion may be absent. In some patients, another source for infection will be present (e.g., pneumonia, urinary tract infection, wound infection). In such cases, the distant infection can be treated, and the catheter may be left in place cautiously with close continued surveillance. On the other hand, if initial history, physical examination, or radiologic studies show no other apparent source, catheter infection should be presumed, and the catheter should be promptly removed. Blood cultures should be obtained from a peripheral vein and through the catheter prior to removal. On removal, the catheter tip should be cultured. The duration of antibiotic treatment depends on clinical response. In general, antibiotic therapy should be continued for a minimum of 2-3 weeks.

Infections in Tunnelled dialysis catheters are,

- Exit site infection is a localized infection of the skin and soft tissue around the catheter exit site. The tunnel is not involved and evidence of systemic infection is absent. The site should be cleaned with appropriate antimicrobial agents, a sterile dressing applied, and systemic or oral antibiotics given. If the exit site infection persists, catheter revision with a new exit site away from the infected area may be required.

- Tunnel infection is infection along the subcutaneous tunnel extending proximal to the cuff toward the insertion site and venotomy. Typically, there is marked tenderness, swelling, and erythema along the catheter tract in association with purulent drainage from the exit site. Tunnel infection requires the immediate removal of the catheter.

- Catheter-related bacteremia is a common complication of cuffed tunnelled catheters with an incidence of 2-5 episodes per 1,000 catheter days (Allon, 2004)[32]. Patients present with signs and symptoms of systemic infection, which may be severe or minimal. Milder cases present with fever or chills, whereas more severe cases exhibit hemodynamic instability. Patients may develop septic symptoms after initiation of dialysis, suggesting systemic release of bacteria and/or endotoxin from the catheter. Gram-positive organisms, primarily Staphylococcus species, are the most common, but Gram-negative organisms may be isolated in up to 40% of cases.

Diagnosis of catheter related blood stream infection (CRBSI)

This requires establishing the presence of bloodstream infection, and demonstrating that the infection is related to the catheter (e.g., there are no alternative sources for bacteremia). Microbiologic confirmation of catheter-related blood stream infection (CRBSI) may be made based on blood cultures obtained prior to initiation of antibiotic therapy meeting one of the following criteria:

1. Culture of the same organism from both the catheter tip and at least one percutaneous blood culture.

2. Culture of the same organism from at least two blood samples (one from a catheter hub and the other from a peripheral vein or second lumen) meeting criteria for quantitative blood cultures or differential time to positivity. Most laboratories do not perform quantitative blood cultures, but many laboratories are able to determine differential time to positivity[33, 34]. These are discussed below.

Quantitative blood cultures demonstrating a colony count from the catheter hub sample ≥3 fold higher than the colony count from the peripheral vein sample (or a second lumen) supports a diagnosis of CRBSI[35]. Semiquantitative cultures demonstrating >15 cfu/ml of the same microbe from the insertion site, hub site and peripheral blood culture also supports a diagnosis of CRBSI.

Differential time to positivity (DTP) refers to growth detected from the catheter hub sample at least two hours before growth detected from the peripheral vein sample.

Sensitivity and specificity for this technique are very good (85 and 91 percent, respectively). This can also be used to make corroborative diagnosis[33].

Complications of catheter related infections.

Delay in therapy or prolonged attempts to salvage an infected cuffed catheter can lead to serious complications, including endocarditis, osteomyelitis, suppurative thrombophlebitis, and spinal epidural abscess. The last is a rare but serious neurologic complication in haemodialysis patients. In one series, 50% of cases were associated with attempted salvage of an infected cuffed venous catheter (Kovalik, 1996)[36]. Presenting complaints are fever, backache, local spinal tenderness, leg pain and weakness, sphincter dysfunction, paresis, and/or paralysis. For diagnosis, magnetic resonance imaging appears to be less sensitive (80%) than computed tomography-myelography. Plain computed tomographic scanning without myelography has low sensitivity and can give misleading results (e.g., disc protrusion). Early (immediate) decompressive surgery usually is advised, although rarely patients can be treated with antibiotics only.

Endocarditis should be suspected in patients in whom fever and bacteremia persist despite appropriate antibiotics and catheter removal. This complication is seen most commonly in the setting of S. aureus bacteremia. The patients frequently develop symptomatic heart failure and a new heart murmur. A transthoracic or transesophageal echocardiogram confirms a valvular vegetation and insufficiency.

Evidence based strategies to minimize infection related complications in venous dialysis catheters

1. Techniques at the time of catheter insertion

Maki et al[37] had reported in systematic review that the rate of catheter related blood stream infection (CRBSIs) for NTDCs is higher than that for TDCs (4.8 vs. 2.7 per 1000 catheter days). In the ICU setting, multiple interventions[38] at the time of venous catheter insertion have reduced the rate of infections which include: adequate hand hygiene, maximal barrier precautions at the time of central venous catheter insertion (sterile gown, mask, gloves and cap) plus full head-to-toe sterile covering of the patient using a specialized sterile drape as opposed to a 'standard-sized' sterile field, 2% chlorhexidine skin antisepsis applied using a 'back-and forth' scrubbing motion for times indicated by the manufacturer on dry areas (IJ site) and moist areas (femoral site), avoidance of the femoral site as far as possible, review of the need for a catheter and removal as early as possible

2. Catheter-locking solutions

The properties of different catheter-locking solutions may influence both thrombus and biofilm formation and associated complications of catheter malfunction and infection. Multiple smaller-scale RCTs have shown that the use of various antibacterial catheter locks (ACLs) for tunnelled haemodialysis catheters (and some studies including NTDCs in addition to tunnelled haemodialysis (HD) catheters) can reduce the likelihood of infectious outcomes compared with conventional locking solutions such as heparin alone. An RCT by Maki et al.[39] included 407

hemodialysis outpatients with tunnelled HD catheters and compared heparin locks with ones containing a mixture of sodium citrate, methylene blue, methylparaben and propylparaben (C–MB–P). The authors demonstrated that C–MB–P locks were associated with significantly fewer CRBSIs and were significantly less likely to be discontinued due to poor flows. While this study presents an exciting avenue for further research, it also highlights one of the difficulties in assessing the evidence with respect to ACLs for NTDCs: studies involving the use of ACLs for tunnelled HD catheters may not be directly applicable to NTDCs given the different settings and clinical circumstances in which they are typically used. One study to focus exclusively on the use of ACLs for NTDCs was an RCT by Kim et al.[40], which included 120 new haemodialysis patients using NTDCs while awaiting placement or maturation of a fistula or graft. This study compared ACLs containing gentamicin (5mg/ml), cefazolin (10mg/ml) and heparin (1000IU/ml) with locks containing heparin alone. The ACL group had significantly fewer CRBSIs (0.44 per 1000 catheter days vs. 3.12 per 1000 catheter days, P =0.031) and no adverse events were reported. Although this study did not detect any methicillin-resistant Staphyloccocus aureus resulting from the ACLs, it was underpowered to do so.

Overall, in addition to the lack of large scale, RCT-based evidence favoring the use of any particular ACL, there are additional concerns that have limited their broad usage: higher costs, practical issues related to the compounding of ACL solutions at individual dialysis centers and, most importantly, the possibility of promoting antibiotic resistance.

Given the possibility of antibiotic resistance, it is an appealing concept to utilize antimicrobial locking solutions containing different antibiotics than those routinely used to treat CRBSIs. A recent RCT that utilized such an approach compared EDTA (30mg/ml) + minocycline (3mg/ml) to heparin (5000U/ml) as the catheter lock solution in 187 catheters (144 were NTDCs) [42]. This study concluded that there were no significant differences in the rate of catheter removal for dysfunction. However, there was a significant improvement in catheter-related bacteremia-free survival (hazard ratio 0.32; 95% CI 0.14–0.71) and 90 day catheter related bacteremia-free survival (91.3% vs. 69.3%) with EDTA + minocycline.

Another consideration is whether catheter locks should contain trisodium citrate (hereafter referred to as citrate) or heparin as the primary anticoagulant to maintain catheter patency. A recent systematic review[42] and meta-analysis compared the use of citrate (with or without antimicrobials) to heparin locks in haemodialysis catheters. This review included 13 studies, two of which considered only NTDCs and two that included both NTDCs and tunnelled HD catheters. The authors concluded that antimicrobial containing citrate solutions with a low to moderate concentration of citrate (i.e., $\leq$ 4%) reduced the incidence of CRBSIs compared with heparin-containing locks. There was no significant difference in exit-site infections or catheter patency. Locks using higher concentrations of citrate ($\geq$ 30%) have been associated with additional safety concerns such as hypocalcemia and arrhythmia related to accidental systemic administration, and were subjected to a manufacturer's recall in the United States for this reason. While variable outcome measures used across the included studies prevented a

subgroup analysis on the basis of catheter type (NTHCs or tunneled HD catheters, specifically), the overall conclusions accord generally with what was observed for studies that involved NTDCs.

A 2011 study of exclusively NTDCs (n = 177) compared three types of locks: 4% citrate + 1.35% taurolidine, 5000U/ml heparin + gentamicin and 5000U/ml heparin alone.23 In this study, citrate + taurolidine significantly reduced CRBSI rates more than heparin alone (RR: 0.37; 95% CI, 0.16–0.84)[43].

Overall, the evidence supports a recommendation that citrate (≤ 4%) locks be favored over heparin locks for NTHCs. Currently, 4% citrate is used in most HD units in Canada in the form of prefilled 5 ml syringes (Citralok, MED-XL, Montreal, QC, Canada) for patients with tunnelled HD catheters. The extent to which it is used for NTDCs is unknown particularly given that NTDCs are often used in ICUs or other critical care areas. It should be noted that, in the United States, none of the most commonly used catheter-locking solutions, including heparin at the 1000 U/ml concentration, are approved by the Food and Drug Administration for use in HD catheters. This also includes 4% citrate which is only available in 250- or 500-ml bags and requires further preparation before being used as a catheter lock.

While citrate catheter locks should be favored over heparin ones, the efficacy and safety of specific ACLs that contain antibiotics or other antimicrobials, including those that also utilize ≤ 4% citrate, have yet to be established by large scale RCTs. Nonetheless, some experts have advocated for the more widespread

use of ACLs with haemodialysis catheters (tunneled DCs and NTDCs) in view of the significant burden of morbidity and mortality associated with CRBSIs amongst HD patients[41]. While the findings of recent studies are encouraging, in view of the potential risks and costs,that large scale, multicenter RCTs of specific ACLs are required before recommending their routine use.

3. Catheter dressing

The Centers for Disease Control and Prevention guidelines[38] provide some guidance about the types of dressings to be used on dialysis catheters, but often do not distinguish between other central venous catheters and TDCs or NTDCs. Sterile transparent semi-permeable dressing or sterile gauze can be used as line dressings. Gauze dressing are recommended for patients with bleeding or diaphoresis, but must be changed every 48 h. Transparent dressings afford the benefit of visualizing the line-entry site for evidence of infection and don't need to be changed for 7 days. During dressing changes, 2% chlorhexidine should be used to clean the skin. If there is a contraindication to chlorhexidine, povidodine–iodine or 70% alcohol can be used as alternatives. Topical antibacterial ointment or creams (povidone–iodine or bacitracin/ gramicidin/ polymixin B) on insertion sites are not recommended except for consideration on tunneled dialysis catheters at the time of insertion and at the end of each dialysis session. Chlorhexidine-impregnated sponge dressing for NTDC cannot be recommended, because studies showing its efficacy in reducing CRBSIs excluded all types of HD catheter.

4. Antimicrobial catheters

Reduction of thrombus and biofilm formation is another potential method to reduce CRBSIs because they are often sources for infection. As such, specialized central venous catheters with antithrombotic and/or antimicrobial properties (e.g., surface coatings, antimicrobial- or antithrombotic-impregnated materials) have been developed. For CVCs in general, there is insufficient evidence for routine use, although they may be indicated in circumstances where high rates of CRBSIs persist despite successful implementation of a 'bundled' program to reduce them[38]. While there is experimental evidence for silver having antimicrobial properties, studies that have assessed the use of silver-coated tunneled HD catheters have not demonstrated a benefit and silver coated NTDCs have not been studied prospectively. A recent RCT[44] that included 77 patients requiring acute dialysis showed significantly less bacterial colonization with a bismuth-coated NTDC, but no significant difference in the primary endpoint of time-to-catheter-removal compared with a conventional NTDC. At the present time, the efficacy and safety of specialized NTDCs for reducing CRBSIs have not been evaluated in large scale RCTs and there are potential barriers to their routine use in the future such as the likelihood of higher costs and, for specialized NTDCs that might be impregnated with antibiotics, the possibility of promoting antibiotic resistance.

5. Staphylococcus. aureus decolonization strategies

Bacterial decolonization with intranasal mupirocin has been shown to significantly reduce the incidence of S. aureus bacteremia for chronic haemodialysis patients

with tunneled HD catheters. A recent, large, cluster-randomized trial[45] (n = 74,256 patients in 73 ICUs) utilized a 5-day decolonization protocol consisting of twice daily intranasal mupirocin and daily bathing with chlorhexidine-impregnated cloths.

This protocol, when applied to all ICU patients, significantly reduced the rate of bloodstream infections (from any pathogen) as compared with a strategy of applying the same decolonization protocol only to methicillin-resistant S. aureus carriers or using a strategy that only involved isolation of methicillin-resistant S. aureus carriers (i.e., no decolonization). It should be noted that this study did not report any analysis on the basis of whether or not patients had a NTDC in place and its applicability to non-ICU patients with NTDCs is tenuous.

Thrombosis of the venous dialysis catheters

The thrombus occurring in association with venous dialysis catheters can be classified as 1. extrinsic thrombus and 2.intrinsic thrombus

Extrinsic thrombus is that which is formed outside the venous catheters

- Central vein thrombus - involves the thrombosis of the central veins
- Mural thrombus - develops at the walls of the vein, where the tip of the catheter rest
- Arterial thrombus - arises from right atrium attached to its wall

Intrinsic thrombus is that which is associated with the venous catheters

- Intra luminal thrombus - the thrombus develops within the catheter lumen
- Catheter tip thrombus - the thrombus develops at the tip of the catheter
- Fibrin sheath thrombus - the thrombus develop as from the fibrin sheath immediately surrounding the catheter lumen

Extrinsic thrombosis is mostly asymptomatic. When encountered, considering its location in the proximal veins, systemic anticoagulation is generally indicated. They are generally treated like deep vein thrombosis, provided there are no contraindications. Under most circumstances, the dialysis catheter should be removed. In cases for which the catheter is functioning adequately and potential sites for vascular access are extremely limited or depleted, it is often possible to preserve the catheter. However, if this strategy is chosen, the patient should be systemically anticoagulated and observed very closely. For small mural thrombi (< 1cm) removal of the catheter alone is sufficient. For those > 1cm, systemic anticoagulation is recommended. Similarly small intra-atrial thrombi respond usually to catheter removal whereas for larger thombi (>2cm) anticoagulation ± surgical thrombectomy is required.

Intrinsic thrombosis can be managed with conservative measures like forceful saline flush and instillation of intraluminal thrombolytic enzyme like tissue plasminogen activator (tPA/alteplase) or tenecteplase. Tenecteplase has the advantage

of having longer half life than tPA (20 minutes versus 5 minutes), which could be an advantage in treating a thrombosed catheter. It also has increased specificity for fibrin and increased resistance to plasminogen activator inhibitor-1, a protein that can interfere with clot-dissolving effects of both naturally-occurring and recombinant tPA. In the following instance the patient can be referred to the interventional vascular specialist for catheter exchange,

- If lytic therapy fails to restore blood flow to a level that will provide for adequate dialysis according to the patient's prescription, the catheter should be exchanged.

- If the duration of the effectiveness of lytic therapy is less than two weeks, serious consideration should be given to exchanging the catheter.

The advantages of the catheter exchange procedure are safety, preserves the exit and venotomy sites, high rate of success. However fibrin sheath stripping is also recommended if there is presence of fibrin sheath during venogram.

Snare catheter stripping of fibrin sheath. This procedure requires cannulation of the femoral vein and advancement of the snare up the inferior vena cava to the occluded catheter. The operator then pulls away the adherent fibrin sleeve/thrombus from the catheter, after which the removed material embolizes to the lung. Clinically evident pulmonary embolism has been reported to result from this procedure but is unusual. The potential delayed effects of multiple iatrogenic pulmonary embolizations on long-term pulmonary function are of theoretical concern. The fibrin sheath tends to reoccur

rapidly after this procedure and the cost of the special snare catheter is several times the cost of a new catheter.

Central vein stenosis, thrombosis, stricture

Incidence: Central venous stenosis arises from endothelial injury at the site of catheter-endothelial contact through the release of a variety of growth factors. The incidence increases with the use of stiff, nonsilicone catheters; with the use of the subclavian approach (presumably because of higher angular stresses on the catheter in the subclavian position); and in patients with previous catheter-related infections.

Presentation/diagnosis: A stenosis may be asymptomatic and clinically silent until unmasked by the creation of an AV fistula. Symptoms are invariably those of gross edema (often explosive) of the entire arm and in extreme case the development of venous skin ulcers. When the stenosis develops after an access has been placed, development of the edema may be slower.

Treatment: Ligation of the vascular access produces the most rapid improvement but sacrifices the access. Initial anticoagulation (with heparin followed by warfarin) and elevation may ameliorate the symptoms and signs if thrombosis is present, but more definitive therapy can be avoided in only a minority of such cases. Balloon angioplasty has been used for stenosis, but the lesion tends to recur. Stent placement combined with angioplasty is indicated in elastic central vein lesions or if the stenosis recurs within a 3-month period. However, stent placement rarely solves the problem long term with stenosis reoccurring in the stent. Some patients may be candidates for surgical axillary-internal jugular bypass of the affected subclavian vein.

ARTERIOVENOUS ACCESS FOR HAEMODIALYSIS

The permanent access for haemodialysis is achieved by creation of an arteriovenous access in the form of arteriovenous fistula (AVF) of arteriovenous graft (AVG). Permanent haemodialysis vascular access should be provided when possible using arteriovenous access to avoid the risks of central venous catheters.

Ideally, an autogenous fistula using the patient's native tissues is created, but when suitable vessels are not available, non-autogenous materials can also be used.

Arteriovenous fistula

This is a autogenous fistula created surgically with an end to side vein to artery anastomosis or rarely, an end to end vein to artery anastomosis for haemodialysis access. The most commonly used fistulas are created by anastomosing the radial artery to the cephalic vein (radio-cephalic fistula) or by anastomosing the brachial artery to the cephalic vein (brachio-cephalic fistula) or basilic vein (brachio-basilic fistula). For the latter, the basilic vein may be mobilized and tunneled laterally to allow easier cannulation (transposed brachio-basilic fistula). Fistulas are less commonly created between the brachial artery and median antecubital vein. Rarely, fistulas can also be constructed in the lower extremity when other sites are exhausted. The order of preference for the AVF are radio-cephalic > brachio-cephalic > brachio-basilic sites.

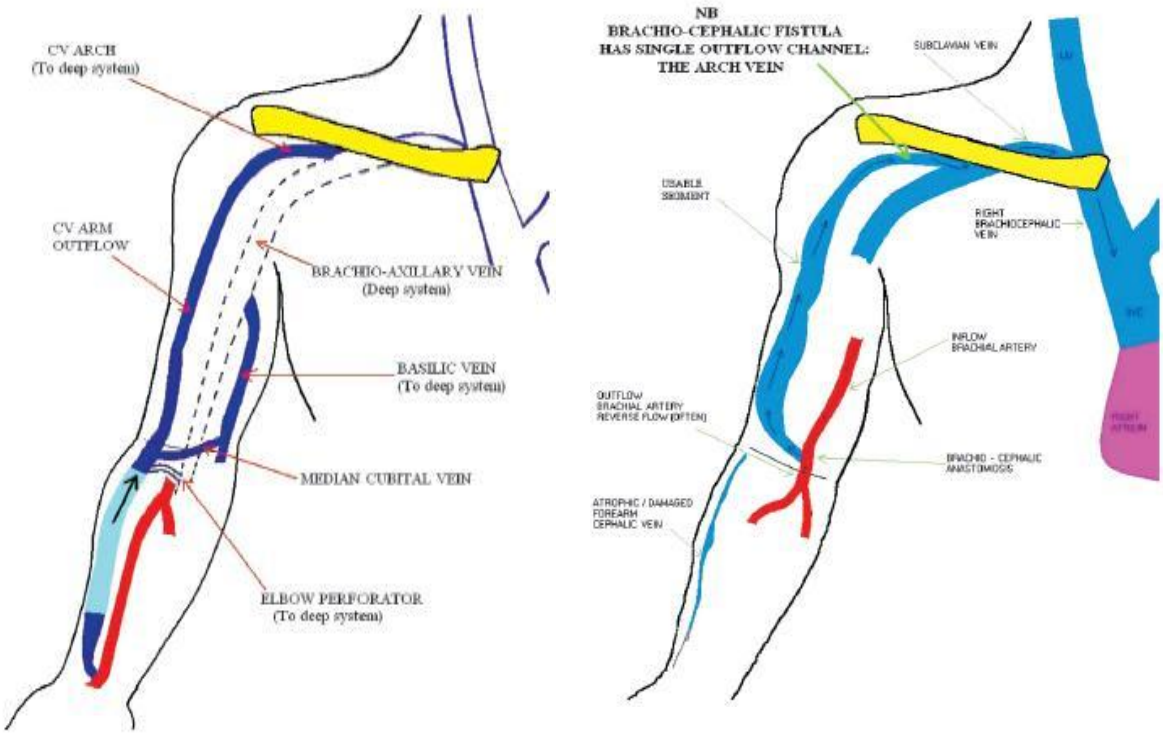


Figure 10: End to side AVFs at the wrist and the arm[47]

Figure 11: Patient undergoing dialysis with radio-cephalic AVF.

Arteriovenous graft

Synthetic grafts are constructed by anastomosing a synthetic conduit, usually expanded polytetrafluroethylene (ePTFE), between an artery and vein. The conduit can be straight or looped and ranges between 4 to 8 mm in diameter. Grafts can be modified to be tapered, thin walled, and reinforced.

The 2006 K/DOQI work group recommends a graft either of synthetic or biologic material. Common graft locations are straight forearm (radial artery to cephalic vein), looped forearm (brachial artery to cephalic vein), straight upper arm (brachial artery to axillary vein), or looped upper arm (axillary artery to axillary vein). The 2006 K/DOQI work group prefers a forearm loop graft to a straight configuration. Leg grafts, looped chest grafts, axillary-axillary (necklace), and axillary-atrial grafts have also been constructed

Figure 12: Forearm straight and looped AVGs[47]

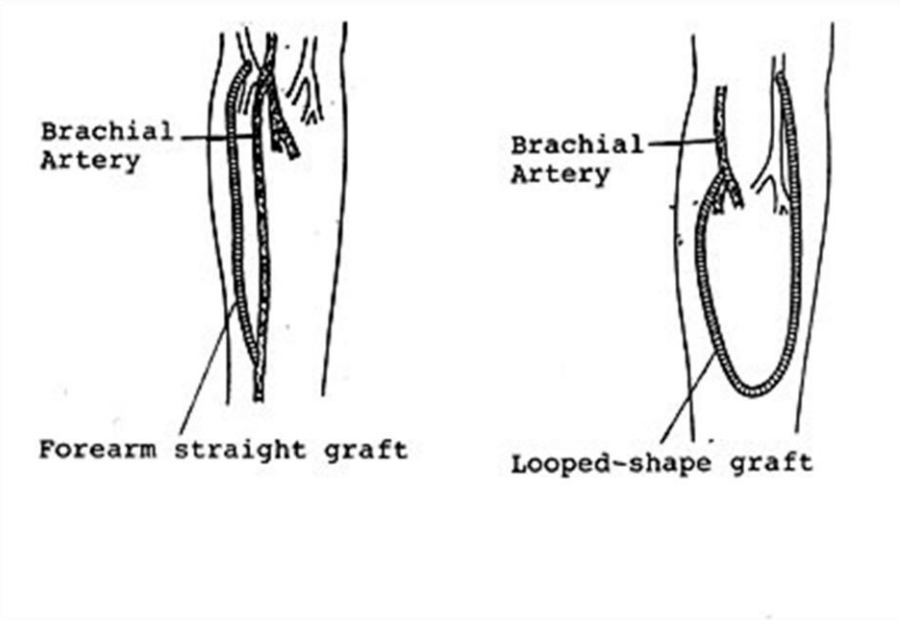


Table 2: Comparison between AVFs and AVGs

PARAMETERS	AVFs	AVGs
Primary failure	Radiocephalics 24-35 % Brachiocephalics 9-12% Brachiobasilics 29-36%	Forearm straight < 15% Forearm loop < 10% Upper arm < 5%
Cumulative patency	53% and 45% at 5 year and 10 year respectively for RC fistulas	67% and 43% for 1 year and 4 year for PTFE grafts. Upper arm > Lower arm
Time to use	Delayed first cannulation (within weeks to months)	Early first cannulation (within days to weeks)
Complications • Thrombosis • Infection	 Lesser thrombosis 2-5% . Transposed fistulas have more infections than non-transposed	 3.8 x more thrombectomies 10%, More than AVFs
Anaesthesia concerns	Usually done under local anaesthesia except for transpositions	Needs regional blocks or general anaesthesia
Cosmetic	Aneurysms causes disfigurement in some	Generally less of aneurysm
Nursing issues	Challenging during early cannulations till fistula is fully mature	Relatively easier

The preferred type of access is a native fistula because a mature fistula has the lowest risk of complications, lowest need for intervention, and the best long-term

patency. To achieve a well-functioning fistula at the time of initiation of dialysis, timely referral for surgery is important. The minimum time for fistula maturation is one month, but a lead time of 6 to 12 months is recommended. Fistulas created at least four months prior to starting haemodialysis were associated with a lower risk of sepsis and mortality.

Most of the benefit was explained by the avoidance of central venous catheters. Intervention may be required to facilitate maturation especially for patients with marginal vasculature. If neither a radio-cephalic fistula nor a brachio-cephalic fistula is possible, then a transposed brachio-basilic fistula should be considered, if the surgical expertise is available and the benefits outweigh the risks of the more extensive surgical procedure. If a fistula is not possible, a graft should be considered.

Complications of arteriovenous accesses

Inadequate Maturation and Flow:

The most common complication of access surgery is inadequate maturation. Selecting an artery with good flow, selecting a vein that is >2.5 mm preoperatively and admits a 7F catheter in the OR, and meticulous surgical technique with loupe magnification when constructing the anastomosis increases the likelihood of vein maturation. Patients who are physically active and regularly squeeze a rubber ball can improve the maturation time of an AVF.

Infection:

Infection is a significant problem, particularly when prosthetic conduit is used. If infection occurs early and involves the graft, it can occasionally be treated with antibiotics. However, late infections that involve the graft usually require either complete graft removal or excision of the infected portion with bypass around the infection.

Arm Edema and Outflow Stenosis:

Patients who develop arm edema after an access procedure usually have a stenosis in the vein proximal to the AVF or AVG. When this occurs, the vein must be interrogated with a duplex ultrasound, magnetic resonance venogram, or fistulogram and dilated to reduce the outflow stenosis. Occasionally, an unrecognized outflow vein occlusion requires takedown of the AV connection to eliminate massive edema.

Thrombosis:

Thrombosis of an AVF or AVG is usually caused by stenosis of the outflow vein, but can also be due to stenosis within the conduit or stenosis of the arterial anastomosis. With AVG thrombosis, revision of the venous anastomosis of the graft is usually required to regain and maintain graft patency. Repeated dilatations of the AVG venous anastomosis are futile and excessively expensive in terms of cost and patient time and should not be performed. Dilatation or revision of other

venous stenosis is useful to regain fistula or graft patency. Techniques to declot the graft with lytic agents and mechanical devices can be used, followed by angiogram to identify the site of stenosis and correct it.

Aneurysm:

Aneurysms occur in AVFs and AVGs due to repeated puncture of the vein wall or the graft wall. When aneurysms enlarge or are filled with thrombus, the segment of the conduit should be replaced. However, the segment should not be sacrificed. Repair of the aneurysm or bypass can often be performed without the need for placement of a temporary dialysis catheter.

Steal Syndrome:

Steal occurs when there is a combination of a large high-flow fistula or graft and a small artery or arterial stenosis or occlusion. Steal syndrome is a significant concern in vascular access surgery because it can lead to ligation of the access, permanent neurologic disability, and litigation. Preoperative risk assessment, intraoperative decision making, and early postoperative (i.e., within 48 hours) monitoring of susceptible patients is therefore important.

In general, patients with normal radial and/or ulnar pulses are unlikely to develop steal syndrome. Unless there is a palpable distal posterior tibial or dorsalis-pedis pulse, most surgeons will not place a thigh AVG. The greater flow in a thigh AVG coupled with greater vascular disease in the lower extremity increases the risk of lower extremity tissue loss. Steal syndrome is more likely to occur in patients with diabetes, small arteries (i.e., radial or ulnar <1.6 mm, brachial <3

mm), absent wrist pulses, Raynaud's phenomenon, vasculitis (e.g., systemic lupus erythematosus), amputations, and other significant peripheral vascular disease. Diabetics with wrist pulses do not require digital plethysmography but should be evaluated24hours postoperatively.

As previously discussed, small arteries should not be used for access. Patients without brachial artery pulses should have preoperative arteriography and appropriate intervention. Patients without wrist pulses but a palpable brachial pulse, Raynaud's phenomenon, vasculitis, or amputations should have preoperative and/or intraoperative digital plethysmography. A preoperative digital pressure (DP) <50 mmHg or a digital-to-brachial pressure index (DBI) <0.6 is usually predictive of steal syndrome, and creating an AVF or placing an AVG in that arm should be avoided. After AVF creation or AVG placement, the surgeon should verify that distal perfusion is adequate; usually by a persistent wrist pulse or occasionally by digital plethysmography.

Loss of a distal pulse in the operating room indicates a technical problem with the arterial anastomosis or excessive access flow. If the DP is <50 mmHg or the DBI is <0.6 after an AVF is created or an AVG is placed, banding with ePTFE of the AVF or placation of the AVG should be performed. Although banding a graft with chronic steal syndrome has been used to reduce flow, the most common procedure for this problem is a DRIL (distal revascularization interval ligation) procedure, in which the hand is revascularized with a bypass and the interval artery is ligated.

Vascular access devices - the expanding horizon

The complications are inherent to all modalities of vascular access devices. There has been a continual effort to upgrade the present available options and to devise approaches to reduce dialysis vascular access dysfunction is through the development of novel therapies targeting both the upstream vascular injury and the downstream vascular response to injury. All the newer modalities would enable the treating physician and surgeon to individualize the vascular access option to every and every patient. The following are some of the examples,

1. Optiflow® connector

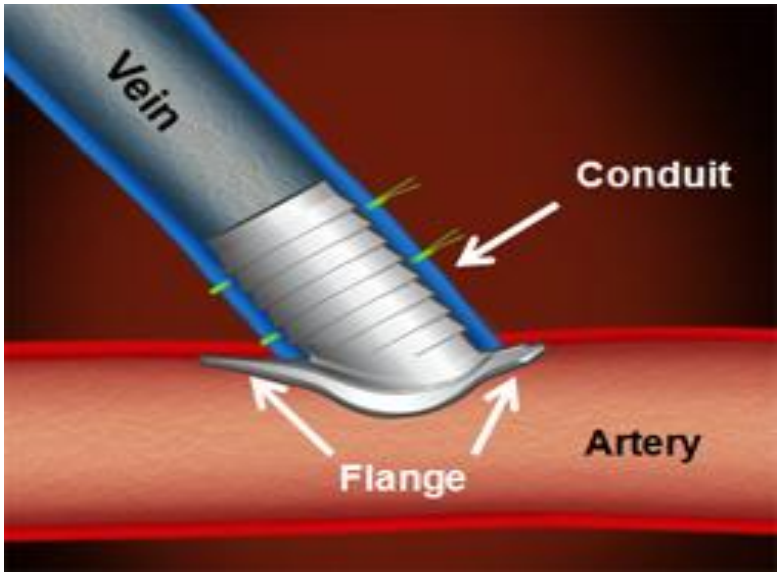


Figure 13: Optiflow connector

Patent - Bioconnect Systems, Inc, USA

This is a sutureless AV anastomotic connector which serves two functions 1. optimize the haemodynamic profile by changing the anastomotic angle. 2. Potentially reducing the surgical time[48].

2. HeRO® graft

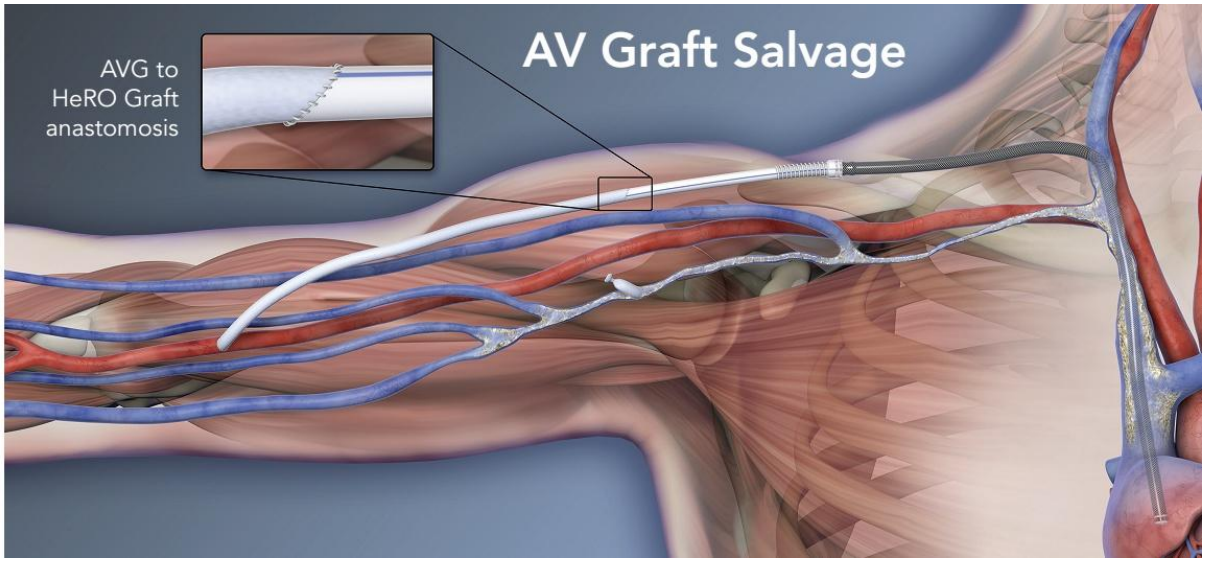


Figure 14: HeRO® graft

HeRO® stands for Haemodialysis reliable outflow.

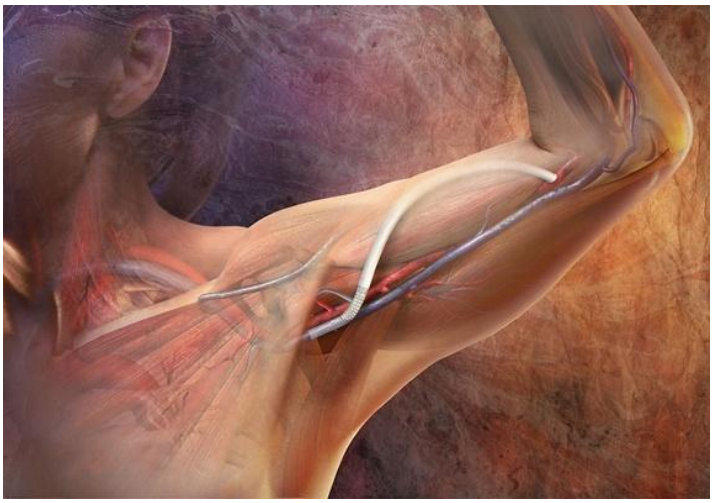
Patent - Cryolife®, Inc. Company (USA).

This is a permanent tunnelled dialysis graft which is connected to a central venous catheter. This modality is useful for patients with central venous stenosis that threatens an otherwise normal AV fistula or AVF graft (helps in AVF/AVG salvage). It also claims to have better cumulative patency at 2 years, lesser infection and superior dialysis adequacy as compared to central venous catheters[49].

3. GORE® Hybrid graft

Patent - . L. Gore & Associates, (USA).

This a hybrid vascular graft with and attached ‘stent-graft’ at the venous end. After the making the arterial anastomosis the compressed stent-graft end is kept inside the vein and opened up, allowing a sutureless end to end anastomosis at the venous end. The



stent-graft also allows high axillary placement for those patients with a long proximal stenosis[50]

Figure 15: GORE® Hybrid graft

4. Sirolimus COLL-R wraps.

This comprises a biodegradable sirolimus-eluting wrap, placed around the AV anastomosis of an AVF or around the graft-vein anastomosis of an AVG, based on the hypothesis that Sirolimus being an antiproliferative agent will prevent the neo-intimal hyperplasia resulting in the increased patency of the AVF/AVG. Phase IIb clinical studies are ongoing[51].

5. Vascugel® endothelial-cell-loaded wraps

Patent - Shire Regenerative Medicine, (USA)

This wrap comprises a gel foam containing endothelial cells. It is proposed that delivery of the endothelial cells to the vicinity of the AV anastomosis or graft-vein anastomosis will provide a local milieu that inhibit the neo-initimal hyperplasia and the resultant untoward vascular remodelling.

6. Paclitaxel-coated balloons

They aim local delivery of Paclitaxel which an antiproliferative agent during balloon angioplasty by dampening the vascular response to injury and thereby preventing the neo-intimal hyperplasia. A pilot study done in AVF grafts has shown a higher post intervention primary patency in the Paclitaxel-coated balloons as compared to that with ordinary balloon (70% vs. 25%)[52].

7. Drug eluting stent

The success of drug eluting stents in the coronary interventions in reducing the re-stenosis has inspired the use of drug eluting stents in the management of vascular access stenosis. Sirolimus eluting stents and Paclitaxel coated had been studied in smaller number in the context of AV grafts with encouraging results[53, 54].

8. Cytograft® bioengineered vessels

Patent - Cytograft tissue engineering (USA)

McAllister et al has successfully grown cells from individual subjects into sheets of tissue that can be wrapped upon templates to create custom made tissue engineered vascular conduits. Cytograft vessels have been successfully put into use in a small number of patients.

9. Humacyte bioengineered vessels

Niklason et al used biodegradable scaffolds to grow human smooth muscle cells from a cadaver, in the shape of vascular conduits. The scaffolds are then decellularized to avoid rejection type reaction in the host. This has been successful in animal models. Human trial are yet to happen[55].

10. PRT-201 elastase

The recombinant human type I pancreatic (PRT201) elastase are proven to destroy the elastin fibers. The application of the PRT-201 elastase after AVF creation will eliminate the elastin fibers in artery and vein and this should favour rapid AVF dilatation and maturation. Better results were observed in the low dose PRT201 group, suggesting the fragmentation of elastin fibres into smaller protein fragments which have potential biological activity could be the potential mechanism of action[56].

MATERIALS AND METHODOLOGY

The study was conducted in AK Lab, which is the dialysis unit of Department of Nephrology, Christian Medical College, Vellore. AK Lab offers haemodialysis to all patients in an outpatient and inpatient setting, barring the critical care haemodialysis patients. The services are offered on 4 shifts on daily basis, running Monday to Saturday. Routine dialyses are not posted on Sundays. Patients with positive virology (HBsAg, HCV antibody and HIV) were dialysed in a separate zone with dedicated machines. The research was designed as a prospective observational, non interventional study. Institutional Review Board (IRB) approval was taken before the study was started (enclosed as annexure).

Recruitment

All adult patients (age more than 18 years) undergoing maintenance haemodialysis in AK Lab as on 1st August 2013 were included. Those patients who were on maintenance haemodialysis for more than 3 months were followed up as prevalent patients and consecutive patients who were newly enrolled for maintenance haemodialysis from 1st August 2013 to 31st October 2013 were followed up as incident patients. Patients were followed up for a total duration of 1 year or till 31st October 2014 whichever is earlier.

Exclusion criteria

1. Age less than 18 years
2. Haemodialysis for indications other than CKD stage 5D (e.g. AKI)
3. Follow up for less than 3 months from the beginning of the study
4. Unwilling to give informed consent (enclosed as the annexure).

Methodology

The data was collected in a proforma (enclosed as annexure) initially in a written format and then entered onto SPSS software.

After taking the informed consent, patient interviews were taken at the study enrolment regarding the demographic profile, financial support, underlying kidney disease, co-morbidities, history of vascular access and its complications. Various intra-dialytic parameters entered in the dialysis records were collected on a monthly basis. Clinical enquiry and examinations pertinent to CKD and dialysis were taken monthly. All the patients were recommended to undergo monthly blood tests for hemoglobin, platelet count and total lymphocyte counts, urea reduction ratio, creatinine, electrolytes, blood sugars for diabetics, calcium and phosphorus and liver function tests. Once in 3 months, patients were recommended to do intact Parathyroid hormone, iron studies and Vitamin D. The blood-borne virus screen was checked before initiating newly on haemodialysis and was recommended to repeat annually. Hepatitis vaccine as per schedule was universally given to all patients at the initiation of dialysis. In view of the observational nature, no new tests were asked to perform for

the study sake. In our center the non tunneled dialysis catheterizations are done by the nephrology residents under real-time ultrasound guidance. If veins are not accessible, in a rare case, the jugular catheterization will be done by interventional radiologist under fluoroscopic guidance in the digital subtraction angiography (DSA) room. The tunneled dialysis catheterizations are generally done by the interventional radiologists under fluoroscopic guidance and occasionally by nephrology residents/consultants under ultrasound guidance.

The AV fistulas are created by the urology residents/consultants in the operation theatre under local or regional anesthesia. Those patients requiring AVF creations and re-explorations are admitted for 24 hours or till the next day morning and are discharged if there are no complications. In cases of difficult vascular access, in rare cases, vascular surgeon creates the AV access.

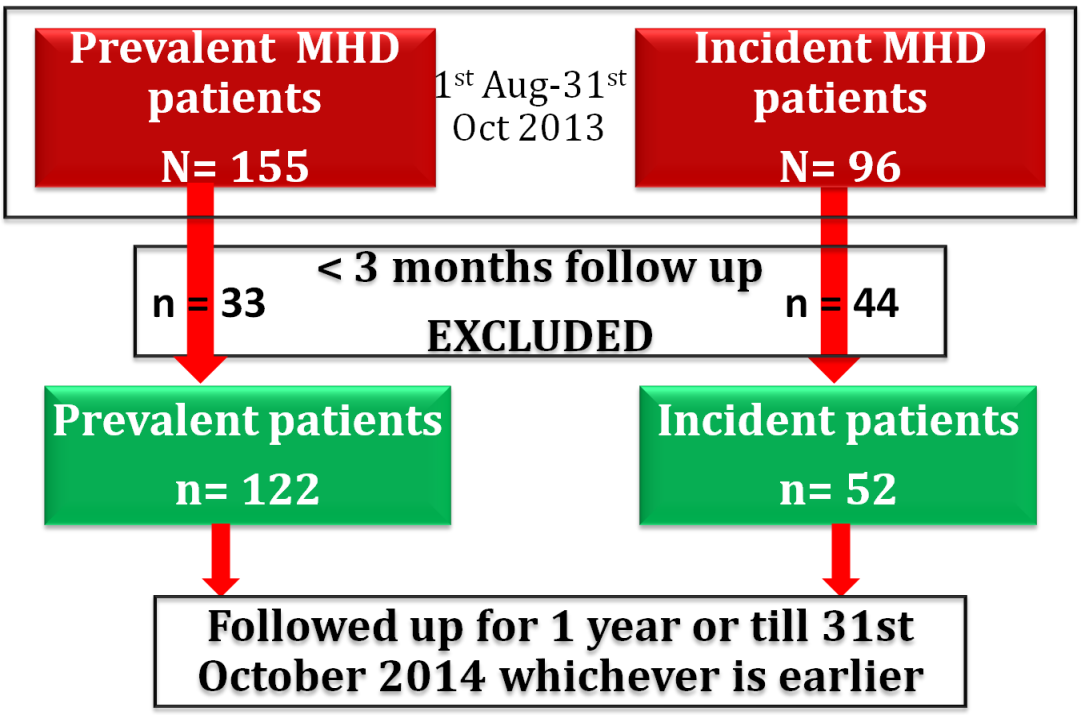
STATISTICAL MEASURES:

Quantitative description of study variables were analysed using descriptive statistical methods. Significance between categorical variables (like AVF thrombosis, AVF stenosis etc) in the subsets study cohort were determined using Chi-square test. Significance between continuous variable (like mean haemoglobin, mean s. albumin etc) were determined using independent-samples *t*-test. Kaplan-Meier survival analyses were used to calculate patency rates, and the log-rank test and Tarone ware test were used to compare patency rates. Statistical significance was assumed at $P < 0.05$. Analyses were carried out using SPSS 17.0 (SPSS, Chicago, IL).

RESULTS

Out of the 155 prevalent maintenance haemodialysis patients, 33 were excluded as they did not contribute to 3 months of prospective follow up. The rest of the patients were followed up as prevalent cohort. During 1st Aug 2013 to 31st Oct 2013, 96 new patients were initiated on maintenance haemodialysis for varying indications. Of whom, 52 patients who fulfilled the inclusion criteria were followed up as incident cohort. All the patients were recommended thrice weekly haemodialysis and twice weekly haemodialysis was offered to those who could not afford.

Figure 16: **Study cohort**



Demographic profile

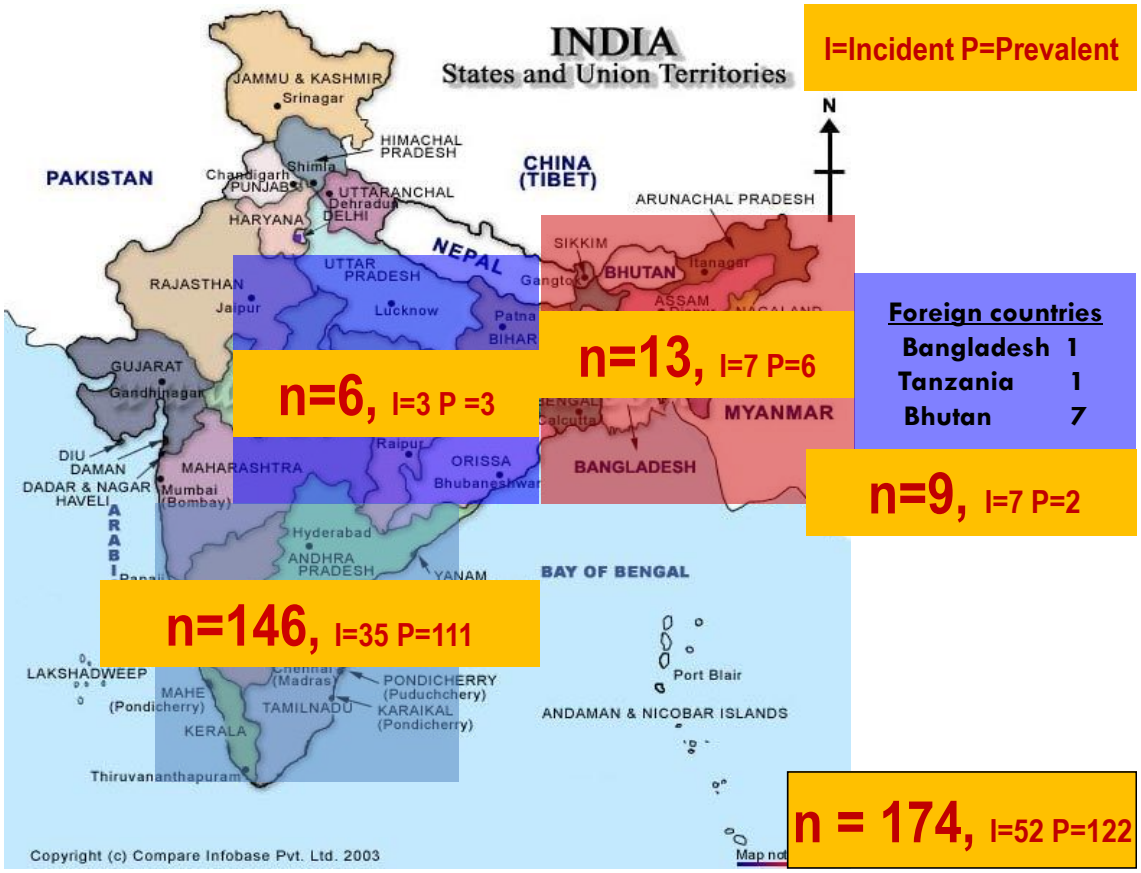


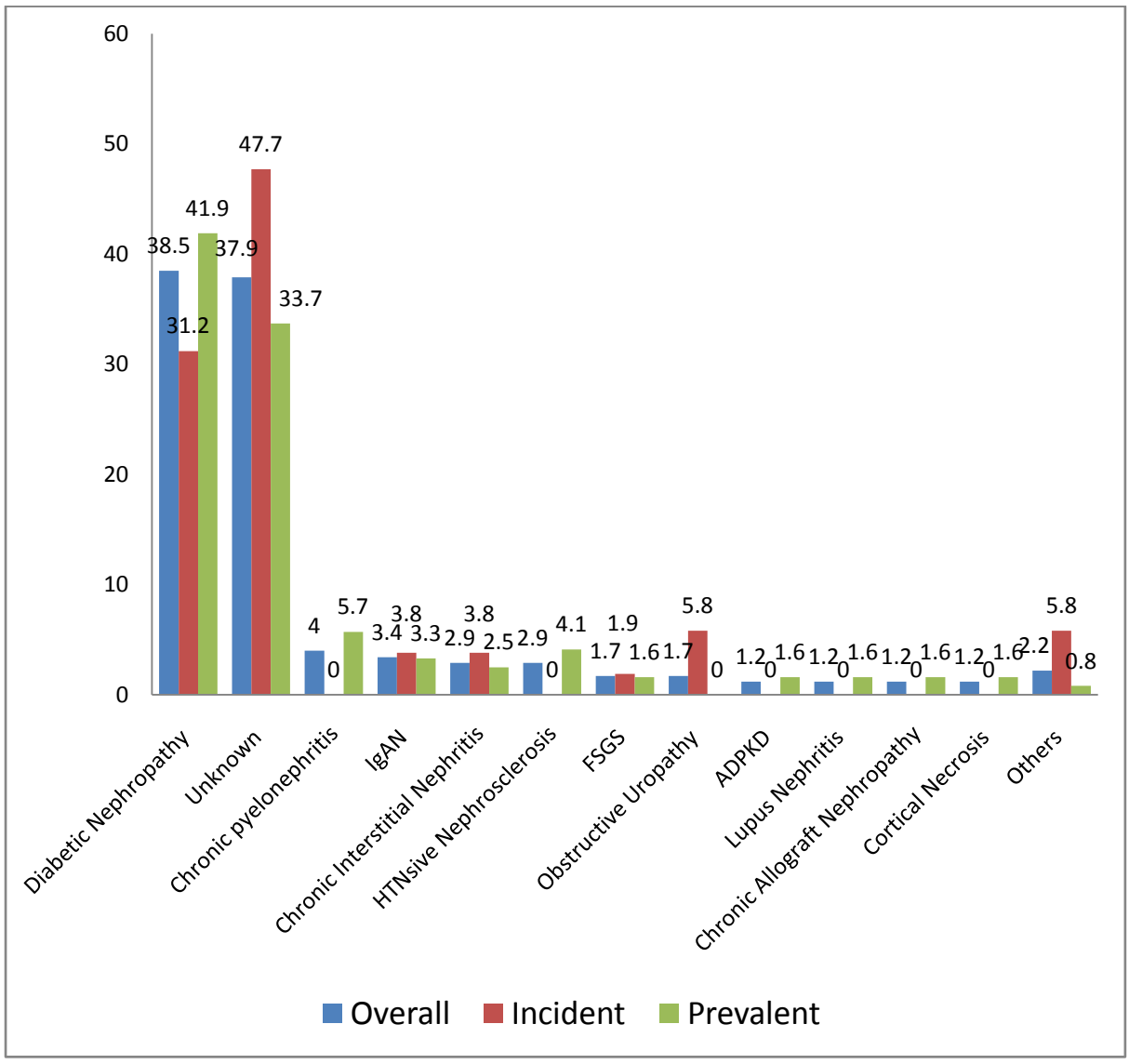
Figure 17: Demographic details of the study cohort

Zone	Prevalent patients N(%)	Incident patients N(%)
South India	111 (91.0)	35 (67.4)
Central India	3 (2.5)	3 (5.8)
North-East India	6 (5.0)	7 (13.4)
Foreign nationals	2 (1.5)	7 (13.4)
Total	122 (100)	52 (100)

Table 3: Demographic distribution of the patients

Most of the patients were from south India, though there was representation from central India, northeast India and a few patients from foreign countries.

Figure 18: **Native kidney disease in the study cohort (as % along y-axis)**



Diabetic nephropathy was the most common native kidney disease in the overall study cohort and in the subset of prevalent patients. In the subset of incident patients unknown native kidney disease was most common closely followed by diabetic nephropathy.

Table 4: **Baseline characteristics**

PARAMETERS	INCIDENT PATIENTS N=52 (%)	PREVALENT PATIENTS N=122 (%)
Age (yrs)	44.5 ± 12.6	53.5 ± 14.7
Sex (M:F)	1.7 : 1	2.4 : 1
BMI (kg/m^2)	23.0 ± 4.9	22.6 ± 4.0
H/o Diabetes Mellitus n (%)	19 (36.5)	62 (50.8)
H/o Hypertension n (%)	43 (82.7)	117 (95.9)
H/o prior thrombotic event n(%)	3 (5.8)	9 (7.4)
Dialysis vintage (days) median (IQR)	0	463 (226 – 563)
Insurance claimable n (%)	18 (34.6)	69 (56.6)
MHD regimen: Thrice weekly n (%) Twice weekly n (%)	36 (69.2) 16 (30.8)	53 (43.4) 69 (56.6)

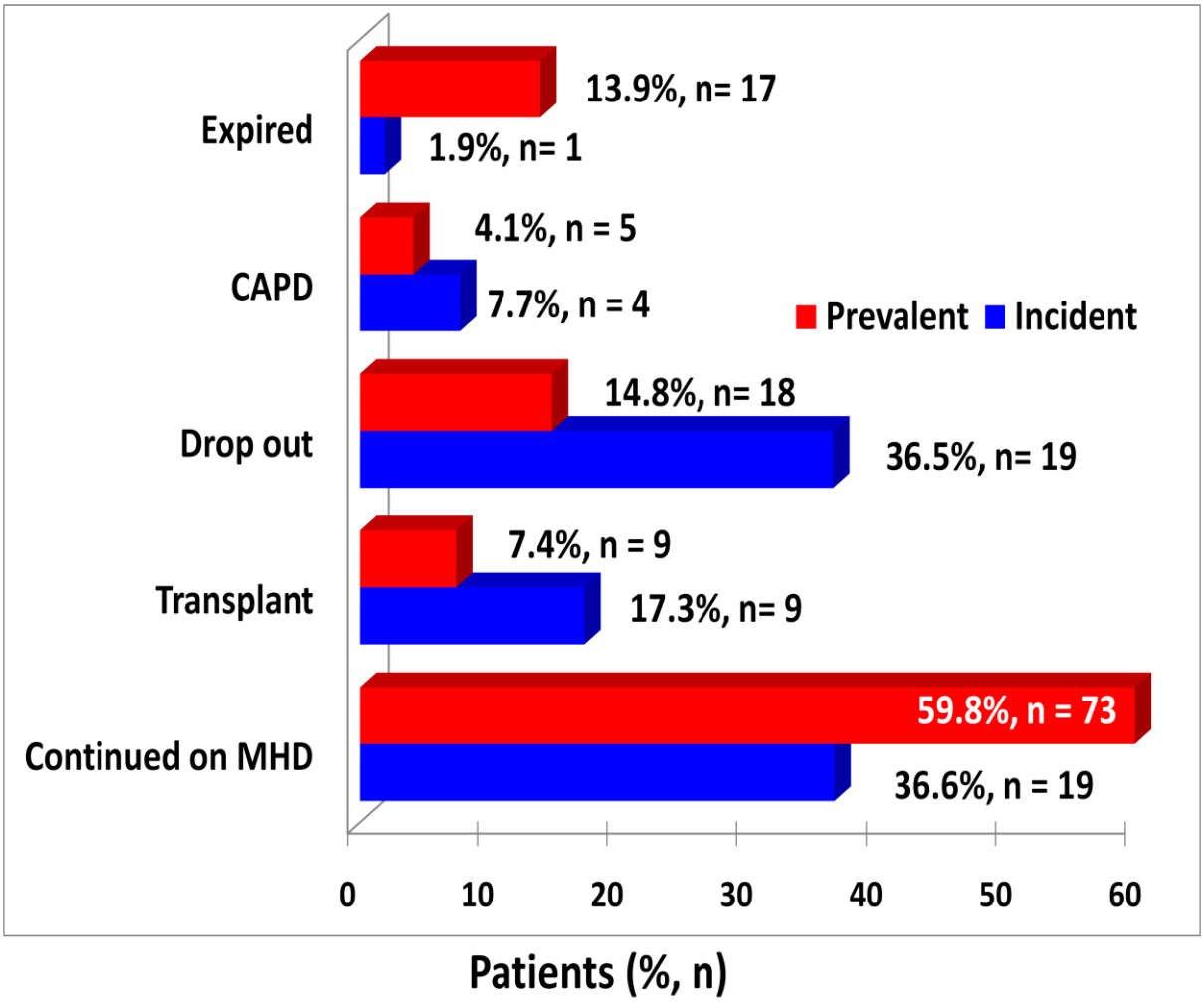
The incident patients were relatively younger than the prevalent patients. Both the groups were male predominant. Hypetension and diabetes were present in majority of the patients. At the baseline, the prevalent patients had a median dialysis vintage of 1.3 years (463 days with inter quantile range - IQR 226-563 days). 56.6% of prevalent patients and 34.6% of incident patients had partial or full insurance claim. 69.2 % of the incident patients were initiated on thrice weekly hemodialysis, whereas only 43.4% of prevalent patients were on thrice weekly hemodialysis.

Table 5: **Dialytic, laboratory and other parameters**

PARAMETERS (Time Averaged Mean)	INCIDENT PATIENTS N=52 (%)	PREVALENT PATIENTS N=122 (%)
Dialysis dose (spKt/V)	1.2 ± 0.2	1.31 ± 0.3
Inter-dialytic weight gain (Kg)	2.4 ± 1.6	2. 1 ± 1.3
Blood flow rate (ml/min)	225.8 ± 31.5	238.6 ± 59.6
Pre HD systolic BP (mm Hg)	154.8 ± 16.8	149.8 ± 16.2
Haemoglobin (g/dl)	9.9 ± 1.7	10.4 ± 1.9
S. Albumin (mg/dl)	3.8 ± 0.7	3.8 ± 0.3
S. Potassium (mmol/L)	4.8 ± 0.6	5.2 ± 0.7
Calcium Phosphorus product	42.3 ± 19.9	37.7 ± 4.6
Average weekly EPO received (IU/Kg/wk)	86.4 ± 43.1	55.1 ± 40.2 P<0.001

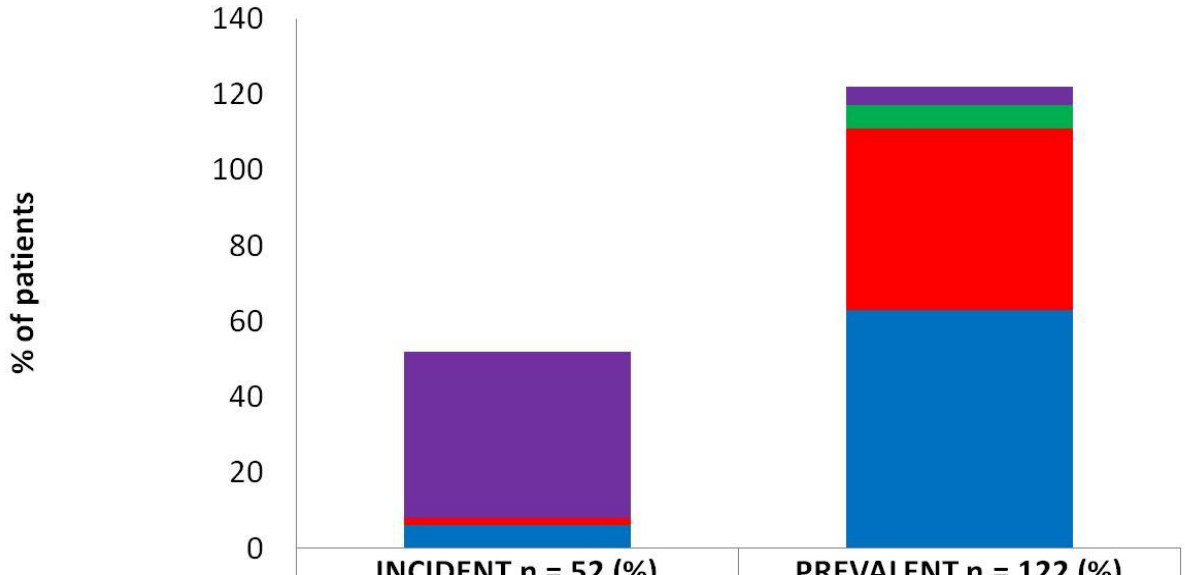
Both the groups received comparable dialysis dosage, had similar interdialytic weight gain and other intradialytic parameters. The time averaged mean of the various laboratory parameters like hemoglobin, serum albumin, serum potassium and calcium phosphorus product were similar. However the mean EPO requirement to maintain the comparable hemoglobin was significantly higher in the prevalent group (86.4 ± 43.1 vs 55.1 ± 40.2; P<0.001) reflecting the higher inflammation and uremia in the prevalent patients.

Figure 19: **Patient status at the completion of the study**



At 1 year follow up 92 patients (52.8) {59.8% of prevalent patients and 36.6% of the incident patients} remained in the maintenance hemodialysis programme. 18 patients (10.3%) expired, 9 patients (5.2%) were converted to CAPD due to access problems, 18 patients (10.4%) underwent renal transplantations and 37 patients (21.3) were lost to followup, largely due to patient migration to native places and for economic reasons.

Figure 20: **Vascular access profile among incident and prevalent patients at the beginning of the study**



	INCIDENT n = 52 (%)		PREVALENT n = 122 (%)	
NTDCs	44	84.7	5	4.1
TDCs	0	0	6	4.9
PROXIMAL AVFs	2	3.8	48	39.3
DISTAL AVFs	6	11.5	63	51.7

At the start of the study 91% (n= 111) of the prevalent patients had permenant vascular access (all AV fistulas). 4.9 % (n= 6) were using tunnelled dialysis catheters. 4.1% (n= 5) were using non-tunnelled dialysis catheters (NTDC) for hemodialysis. Among NTDC users 3 were having access dysfunction and 2 were awaiting fistula maturation. None had AV grafts.

15.3% of the incident patients (n=8), inititated on maintenance hemodialysis with AVFs. The rest 84.7% (n=44) initiated on HD with NTDCs.

VASCULAR ACCESS OUTCOMES

Outcomes - AV FISTULAS

The outcomes of AVFs were studied in incident and prevalent patients separately, as the prevalent patients would have the 'lead time bias', which makes the two groups not comparable. The number of days each patient had a working AVF on them was noted to calculate the total number of AVF days in incident and prevalent patients for calculating the incidence of complications.

INCIDENT PATIENTS N = 52	N
Pre-emptive AVFs	8
Non pre-emptive AVFs	39
AVFs after failed fistulas	7
Total AVFs	54

47

PREVALENT PATIENTS N = 122	N
Vintage AVFs	111
AVFs after failed fistulas	6
Total AVFs	117

Table 6: AVFs in the study cohort

A total of 47 AVFs (Preemptive AVFs and those newly created after initiating HD) were studied in the incident patients for complications and outcomes.

In the prevalent patients there were 111 AVFs to start with which were studied. Repeat AVFs created (7 in the incident patients and 6 in the prevalent patients) after a fistula failure. They were excluded from calculating survival analysis. The total number of AVF-days was 41580 days (Incident : 7525 days; Prevalent 34055 days).

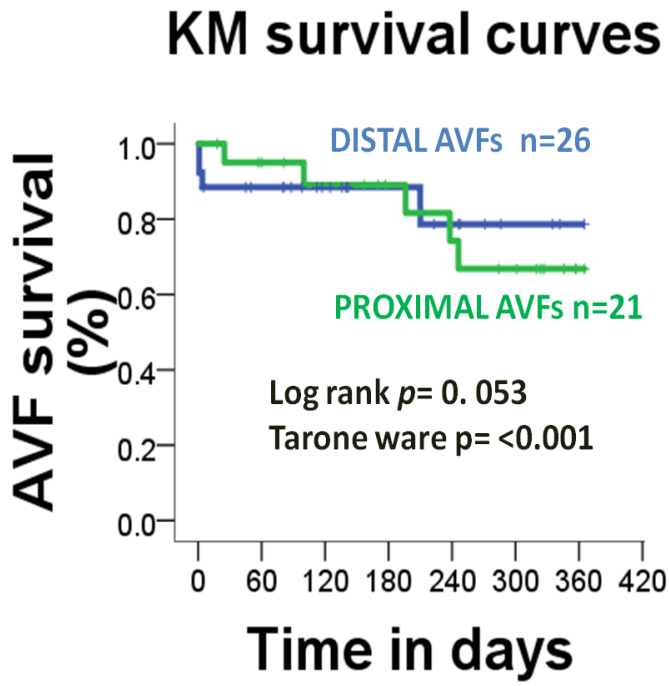
Table 7: AVF COMPLICATIONS - INCIDENT PATIENTS

Adverse outcome episodes	Incident Patients N=47 (%)				Incidence per 1000 AVF days
	Pre-emptive AVFs n=8(%)	Non pre-emptive AVFs n=39(%)	*P* value	Total n=47(%)	
AVF Thrombosis	2 (25)	13 (33.3)	.261	15 (31.9)	2.10
AVF Local hematoma	2 (25)	8 (20.5)	.446	10(21.3)	1.32
AVF Stenosis	1 (12.5)	6 (15.3)	.888	7(14.9)	0.93
Limb edema (CV stenosis)	Nil	1 (2.5)	.647	1(2.1)	0.13
AVF infections (bacteremia)	Nil	1 (2.5)	.647	1(2.1)	0.13

Among the incident patients, the AVF complications were compared between those who had pre-emptive AVFs and those who did not. There complication rates were more among non-preemptives. However the difference was not statistically significant.

The incidence of various complications were also compared to that of the published literature. Incidence of AVF thrombosis was much higher than that reported in the literature (2.10 vs 0.68 per 1000 AVF days). Among the late complications limb edema and AVF stenosis were less common and were comparable to published literature. 1 patient had systemic bacterimia attributable to AVF.

Figure21: 1 year survival of the distal vs. proximal AVFs in incident patients



Mean survival of DISTAL AVF at 1 year f/u = 307 ± 25.9 days vs PROXIMAL AVF = 301.5 ± 24.9 days

In the incident patients the Kaplan Meir survival curves were used to compare the 1 year survival (censored for all patient outcomes other than CAPD conversion for access dysfunction) between those with distal AVFs vs proximal AVFs.

The distal AVFs (RC AVF) had significantly more mean surival than the proximal AVFs (BC AVF and BVT), at 1 year (307 ± 25.9 days vs 301 ± 24.9) (p value < 0.001)

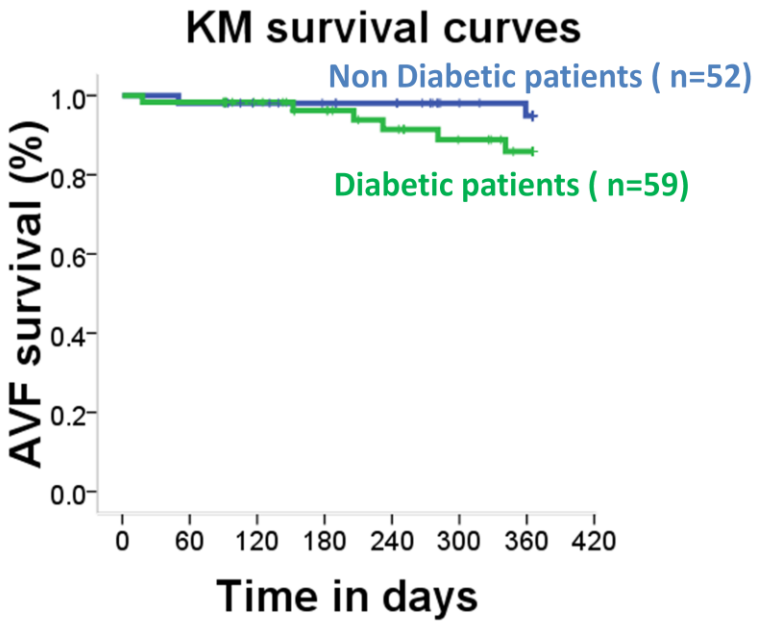
Table 8: AVF COMPLICATIONS - PREVALENT PATIENTS

Adverse outcome episodes	Prevalent Patients N=111 (%)				Incidence per 1000 AVF days
	Diabetics n=59(%)	Non Diabetics n=52(%)	*P* value	Total n=111 (%)	
AVF Thrombosis	12 (20.3)	6 (11.5)	.378	18 (16.2)	0.53
AVF Stenosis	6 (10.1)	6 (11.5)	.817	12 (10.8)	0.34
AVF Local hematoma	5 (8.4)	2 (3.8)	.317	7 (6.3)	0.21
Limb edema (CV stenosis)	6 (10.1)	1 (1.9)	.293	7 (6.3)	0.21
AVF infections **- Local Cellulitis** **- Bacteremia**	 1 (1.6) 2 (3.3)	 Nil Nil	 .346 .180	 1 (0.9) 2 (1.8)	 0.03 0.06
AVF Steal	1 (1.6)	Nil	.346	1 (0.9)	0.03

Among the prevalent patients the AVF complications were compared between diabetics and non-diabetics. Though the diabetics had more complications than the non diabetics, the difference didn't reach statistical significance.

Overall complication rates were comparable to that of the published literarture. 2 patients had AVF associated bacterimia and 1 patient had limb cellulitis. The incidence of complications were thrombosis > stenosis > local hematoma > cental vein stenosis > infections > steal.

Figure 22: 1 year survival of AVFs in diabetic vs. nondiabetic prevalent patients



Mean survival for AVFs in non-diabetics at 1 year f/u = 358.7 ± 5.9 days vs diabetics = 344. 8 ± 8.7 days

In the prevalent patients the Kaplan Meir survival curves were used to compare the 1 year survival (censored for all patient outcomes other than CAPD conversion for access dysfunction) between those with diabetics and non diabetics.

The non diabetics had better mean survival of AVFs as compared to the diabetics (358.7 ± 5.9 vs 344.8 ± 8.7) at 1 year. However this difference didn't reach statistical significance (p value = .189)

Table 9: **AV Fistula failures**

AVF FAILURES	INCIDENT PATIENTS N = 52	PREVALENT PATIENTS N = 122
	Total AVFs, N = 47	Total AVFs, N=111
PRIMARY FAILURES	6/39 (15.3%)	NA
SECONDARY FAILURES	9/47 (19.1%)	14/111 (12.6%)

In the incident patients the primary AVF failure rate was 15.3% and it was among the lower side of the published literature. The same was true regarding the secondary failure rate among incident (19.1%) and prevalent patients (12.6%).

AVF SALVAGE TECHNIQUES

1. Number of surgical reexplorations attempted: 16/29 (55.2%)

   Successful reexplorations: 7/16 (43.8%)

2. Number of Interventional radiological procedures: 9

   Angioplasty for central venous stenosis: 8 (Successful 7 (87.5%)

   Fistuloplasty attempted: 1 (Successful 1 (100%)

Outcomes - TUNNELLED DIALYSIS CATHETERS

INCIDENT PATIENTS N = 52	N
TDCs at enrollment	0
New TDCs	1
Total TDCs	1

PREVALENT PATIENTS N = 122	N
Vintage TDCs	6
TDCs after enrollment	1
Total TDCs	7

Table 10: TDCs in study cohort

Among the prevalent patients 6 had Tunnelled Dialysis Catheter for vascular access. At 1 year follow up 1 patient was changed over to TDC due to AVF failure. None of the incident patients were initiated on HD with a TDC. During the follow up period 1 patient was changed over to TDC. A total of 8 TDCs were studied during the 1 year. Total number of tunnelled dialysis catheter days : 2512 (Incident patients 2414 days, Prevalent patient 98 days)

Adverse outcome episodes	N=8 (%)	Incidence per 1000 TDC days
Breakage	2 (25.0)	0.80
Thrombus	1 (12.5)	0.40
Infection (CRBSI)	1 (12.5)	0.40
Central Venous Stricture	1 (12.5)	0.40
Requirement for fibrin sheath stripping	1 (12.5)	0.40

Table 11: TDC complications

The complications occurred in TDCs were catheter breakage, thrombus formation, CRBSI, central venous stricture and requirement of fibrin sheath stripping for poor flow (in the order of decreasing frequency). All the complications including the infections were managed conservatively, with salvage of the catheter. None of the complication was life threatening. All complications in TDCs were managed conservatively with 100% patency rate at 1 year.

Outcomes – NON-TUNNELLED DIALYSIS CATHETERS

INCIDENT PATIENTS N = 52	N
NTDC at enrollment	44
New NTDCs afterwards	23
Total	67

PREVALENT PATIENTS N = 122	N
NTDC at enrollment	5
New NTDCs afterwards	14
Total	19

Table 12: NTDCs in study cohort

Non-tunnelled Dialysis Catheters (NTDCs) were used mainly to initiate hemodialysis in those with out a preemptive AVF or as stop-gap arrangement in those with access dysfunction. Among the incident patients, 44 patients used NTDCs to initiate HD and 23 more catheters were needed subsequently. Among the prevalent patients 19 NTDCs were used during the study periods. Covidien (Mahurkar™) double lumen jugular or femoral catheter were used for dialysis initiation.

Total number of non tunnelled dialysis catheter days : 6540 (Incident patients 4965 days, Prevalent patients 1581 days)

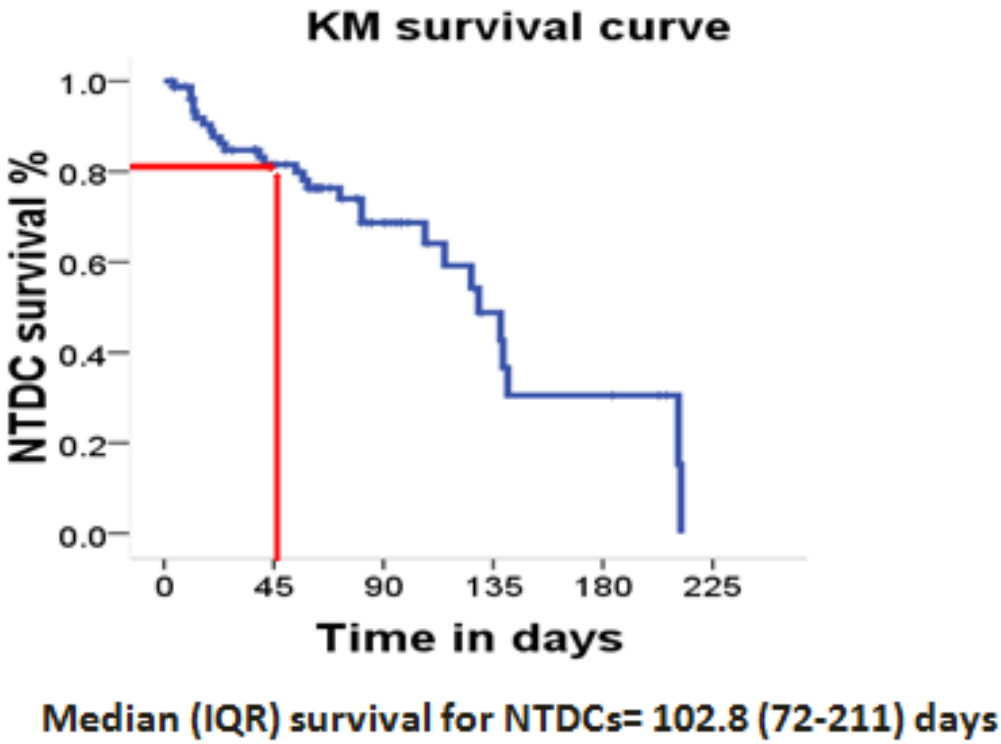
Adverse outcome episodes (catheters)	N = 86 (%)	Incidence per 1000 NTDC days
Infection - CRBSI	21 (24.3)	3.2
Thrombus	12 (13.9)	1.83
Catheter fracture (breakage)	2 (2.4)	0.30
Catheter kinking	1 (1.2)	0.15
Insertion related (hematoma)	1 (1.2)	0.15

Table 13: NTDC complciations

Infections, as expected were more in the NTDCs as compared to TDCs and AVFs. Among the non infections complications except for incidence of catheter thrombosis the others were less common. The catheter fracture and catheter kinking were seen in 2.4% ans 1.2% of patients respectively. Insertion related complication (local hematoma formation) was seen in only 1 patient.

CRBSI were due to the following microbials given in the decreasing order Coagulase negative staphylococcus {6}, Staphylococcus aureus {4}, Enterobacter {3}, NFGNB (not speciated) {2}, Klebsiella {2}, Serratia {2}, Anerobes {1} and polymicrobial {1}.

Figure 23: Survival of Non-Tunnelled DialysisCatheters



NTDCs survival at 45 days was 80.8%.

The median survival of NTDCs was 102.8 days with interquartile range (72-211 days) which reflect the delay in placement of permanent access in patient initiating on HD possibly because of the economic burden of RRT initiation.

DISCUSSION

The present study was a single-center observational study on vascular access profile of adult incident and prevalent maintenance haemodialysis patients. Demographically, most of our patients are from south India. However, nearly 32.6% of incident patients and 11% of the prevalent patients are from central, north-east India and a few from foreign countries. They represent the people who come to our center with plans of transplant, either live or deceased donor and those who come for management of complications of haemodialysis.

In the developing countries the mean age of the patients receiving maintenance haemodialysis is much lower than that in the developed countries (32-42 years vs. 60-63 years) [57-60]. The mean age of our patients was 50.8 ± 14.3 years (44.5 ± 12.6 years in the incident patients and 53.5 ± 14.7 years in the prevalent patients). Though younger than the western cohorts, the mean age of haemodialysis patients were higher than that published in a prior study (mean age 38.6 ± 13.9years) from our center by Madhumathi et al in 1998 [5]. This would probably a reflection of the favourable change in pattern of diagnosis and treatment seeking for CKD in India.

The study cohort was male predominant (female : male 1: 2.2), which is similar to what other studies have reported [61, 62]. The majority of our patients had diabetic nephropathy (38.5 %) as the cause of end-stage renal disease. In the landmark DOPPS II study (Dialysis Outcomes and Practice Patterns Study), the incidence of diabetes mellitus was 52%, 41% and 26%, and in the United States Canada and Europe respectively[63]. The prevalent patient had a median dialysis vintage of 1 year and 3

months at the baseline. 50% of patients had some form of insurance reimbursement. This is also an improvement from 24.8% insurance claimable patients reported in the previous study[61] from our center.

Intra-dialytic parameters like average blood flow, dynamic venous pressure, trans-membrane pressure were recorded and the time-averaged mean for the above parameters among the incident and prevalent patients were comparable. The single pool Kt/V (derived from URR) of was 1.28 ± 0.2 (incident patients 1.2 ± 0.2 and prevalent patients 1.31 ± 0.3).

The time averaged mean hemoglobin in incident patient was 9.9 ± 1.7 and that of the prevalent patients was 10.4 ± 1.9 (p value 0.145), which was comparable. However the average Erythropoietin the incident patient received during the study period was 86.4 ± 43.1 IU/kg/week as compared to 55.1 ± 40.2 IU/kg/week of Erythropoietin received by the prevalent patient during the same period. This difference was statistically significant (p value <0.001). Also, the incident patient had received significantly higher dose (p value < 0.001) of Erythropoietin during the first 3 months of initiation of haemodialysis than during the rest of the study (100.5 ± 47.6 IU/kg/week vs. 80.6 ± 60.3 IU/kg/week). This may be because of the greater deficit indicating the lack of adequate pre-dialysis care among our patients. As the patients are continued on MHD the uremia related RBC destruction may decline with resultant better mean haemoglobin and less Erythropoietin requirement.

Various lab parameters like albumin, calcium, phosphorus, liver enzymes (SGOT and SGPT) and electrolyte were compared between the incident and prevalent patients. Serum potassium (incident 4.8 ± 0.6 mmol/L vs. prevalent 5.2 ± 0.7 mmol/L;

p value .002) and intact PTH (incident 328.5 ± 219.2 pg/ml vs. prevalent 501.9 ± 428.9 pg/ml) was significantly higher among the prevalent patients. All other biochemical parameters studied were comparable between the two groups.

The patient outcome at the end of the study was compared to the prior study from our institution in 1998[61].

Table 14: CAUSES OF MORTALITY IN STUDY COHORT

Causes of death	Madhumathi et al[61] % (adapted from)	Current study %
Uremia/Volume overload	23.4	5.5
IHD	29.5	27.9
Sepsis	34.5	33.4
CVA	8.4	5.5
Others (intestinal infarct, post surgery)	4.2	5.5
Expired at home. Cause unclear	-	22.2

The mortality among the study cohort was 10.3% which was similar to that reported earlier from our center which was 9.5%. The increased uremia related mortality in Madhumathi et al report is because of that cohort included only incident patient whereas in the current study prevalent patients were also included, who had

their uremia related symptoms controlled. One of the incident patients in our study died of volume overload and uremia.

(The patient outcome at 1 year follow up was accounted for censoring while calculating the survival of the access. I.e. the access survival was censored to all patient outcomes other than conversion to CAPD due to access dysfunction)

Guidelines developed by the National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (KDOQI) and the Fistula First initiative promote construction of AV fistulas, targeting at least 60% use of AV fistulas in patients beginning dialysis and 65% fistula use in prevalent patients[64, 65]. In our study cohort 15.3% of the incident patients initiated on MHD with a pre-emptive AVF which was far less than the recommendation. Only 34.6% (n=18) of the incident patients had an early referral to the nephrologists. Late referral and financial burden of dialysis initiation may be the reasons of poor penetration of AVF at dialysis initiation. 91% of the prevalent patients had AVF as the vascular access as against the target of 50%, which is an encouraging trend.

AVF OUTCOMES

The AVF complications among incident patients were studied and compared to the published literature. Also complications were compared between those who had pre-emptive AVFs (n=8) at initiation of HD and those who did not (n= 39). There was no statistically significant difference between the complications occurred in the two groups. This could be because of the small number of the patients in group with pre-emptive AVFs. Notably the limb edema and bacteremia did not occur in those who

had pre-emptive AVF, highlighting the possible benefits that can be aimed by creating pre-emptive AVFs along with the complications associated with a central line.

The most common complication was AVF thrombosis. The incidence of AVF thrombosis in the incident patients were much higher than what is accepted by the NKF KDOQI guideline, 2006 updates (2.10 vs 0.68 per 1000 AVF days). This could probably because of the poor vasculature seen in our patients. Larger study may be helpful to validate this finding.

Table 15: AVF COMPLICATIONS IN INCIDENT PATIENTS COMPARED TO PUBLISHED LITERATURE

Adverse outcome	Current study	Published literature	(Reference)
Thrombosis	2.10 / 1000 AVF days	0.68/ 1000 AVF days	CP guidelines[64]
Thrombosis	0.77/ patient yr at risk	<0.25/ patient yr at risk	CP guidelines[64]
Local hematoma	1.32 / 1000 AVF days	-	-
AVF stenosis	14.9 %	14- 42%	Stolic[67]
Central vein stenosis	2.1 %	4-14%	Schumacher[68, 69]
AVF bacteremia	0.13/ 1000 AVF days	0.073/ 1000 AVF days	O'Brien et al [66]
AVF bacteremia	0.047/ patient yr at risk	0.01/ patient yr at risk	Jindal K et al[65]
AVF Steal	-	2-8%	Stolic[67]

The rest of the complications were comparable to that reported in prior studies. The incidences of AVF stenosis and central vein thrombosis were comparatively lower. Incidence of AVF associated bacteremia are variably reported in the prior studies [65, 66] , which was marginally higher from what was obtained from the present study.

The 1 year survival of the distal AV fistulas (radio-cephalic fistulas) was significantly better than the proximal AV fistulas (brachio-cephalic fistulas and basilic vein transposition). In our center those patients with multiple risk factors for fistula failure, the urologist generally creates brachio-cephalic fistulas.

This is based on the prior knowledge that the proximal AVFs had lesser primary failure rates. In the published literature this advantage of the proximal fistula is only when radio-cephalic fistulas are compared against the brachio-cephalic fistulas. The brachial vein transpositions had more rate of primary failure and lesser primary patency in the prior studies.

In the present study the better survival of the distal AVFs could be because of the selection bias at the time of creating the AVFs, as proximal fistulas are often attempted in the first place in patients with poor vasculature, women and those with adverse surface anatomy like obesity and also because the basilic vein transpositions and brachio-cephalic fistulas are considered together.

Table 16: AVF COMPLICATIONS IN PREVALENT PATIENTS COMPARED TO PUBLISHED LITERATURE

Adverse outcome	Current study	Published literature	(Reference)
Thrombosis	0.53 / 1000 AVF days	0.68/ 1000 AVF days	CP guidelines[64]
Thrombosis	0.19 / patient yr at risk	<0.25/ patient yr at risk	CP guidelines[64]
Local hematoma	0.21 / 1000 AVF days	-	-
AVF stenosis	10.8 %	14- 42 %	Stolic[67]
Central vein stenosis	6.3 %	4-14 %	Schumacher[68, 69]
AVF bacteremia	0.06/ 1000 AVF days	0.073/ 1000 AVF days	O'Brien et al [66]
AVF bacteremia	0.02/ patient yr at risk	0.01/ patient yr at risk	Jindal K et al[65]
AVF Steal	-	1 %	Stolic[67]

All the complications except infections were lesser than that in previous publications. This was probably due to the 'lead-time bias' which the prevalent patients have. Relatively, thrombosis, steal-phenomenon and local hematomas are

considered as early complications of AVF and stenosis and central vein stricture are considered as the late complications. The prevalent patient had a dialysis vintage of 1.3 years at the beginning of the study. As expected the incidence of thromboses and local hematomas are low in our study. Incidence of AVF stenosis and central vein stenosis are higher than that of the incident patients.

AVF bacteremia occurrence, though lesser than that of incident patients, was still higher that which is accepted (0.02 vs. 0.01 per patient year at risk)

The 1 year survival of AVF in the diabetic patient was lesser than that of the non-diabetic patients in the incident cohort. However this difference was not statistically significant at 1 year.

Table17: PRIMARY AVF FAILURE

Current study	15.3%
Ohira et al[70]	7.6%
Gowda et al[71]	21.4%
Huijbregts et al[72]	40%

The primary AVF failure rate among the incident cohort is lower among the varied rates reported across the world. Gowda etal[71] has reported a primary failure rate of 21.4% from India.

The secondary AVF failure rates have been variably described from 0-39% by Huijbregts et al[72]. The secondary AVF failure rate was 19.1% in the incident cohort

and 12.6% in the prevalent cohort, which were also among lower in reported literature.

TUNNELLED DIALYSIS CATHETER OUTCOMES

As per the vascular access work group recommendations [65] the usage of tunnelled dialysis catheter for permanent dialysis access (e.g., not as a bridge) should be restricted to less than 10% of patients. Among our prevalent patients 7 (5.7%) had TDCs as permanent dialysis access. One of the incident patients had used TDCs as long term vascular access a bridge to renal transplant.

Table 18: COMPARISON TUNNELLED DIALYSIS CATHETER COMPLICATIONS

Adverse outcome	Current study	(Adapted from) K Sampathkumar et al[73]
Mechanical complications	25 % (breakage)	2 % (cuff- extrusion)
Thrombus	12.5 %	2 %
Bacteremia (CRBSI)	12.5 %	6 %
Exit site ooze	-	8 %
Central venous stricture	12.5 %	-
Requirement for fibrin sheath stripping	12.5 %	-

The complications in the TDC users were compared to that of recent study published from India by K Sampathkumar et al[73]. In the current study incidence of complications were much different due to the fact that we had a much smaller number of TDCs (8 vs. 100). Also 7 out of 8 (i.e. 87.5%) of our patients were prevalent patients where as in Sampathkumar et at study had all incident patients. The long access vintage in the prevalent group would have been the cause of complications like catheter breakage and need for fibrin sheath stripping in our patients. Also the 'lead time bias' could have contributed to the increased occurrence of thrombus, bacteremia and central vein thrombosis.

All the complications in our patients were managed conservatively with 100% catheter salvage and patency during the follow-up. The catheter salvage had happened partly because of the patient's reluctance to accept CAPD and lack of financial support.

NON TUNNELLED DIALYSIS CATHETER (NTDC) OUTCOMES

In concurrence from the prior published data by Varughese S et al[11] from the same institution and Swarnalatha et al[12] from another institution in India majority (84.7 %) of the new initiation of HD happened with Non Tunnelled Dialysis Catheters NTDCs in the current study. This is partly due to the fact that only 34.6% of our patient had early referral to nephrologists and partly due to the economic burden of the dialysis in India.

The K/DOQI guidelines suggest NTDCs to be used for less than one week and that TDCs be placed for those who need dialysis for longer than one week[65].

Unfortunately the TDC placement is more expensive and patients wait for fistula creation and maturation after the NTDC insertion resulting in its prolonged usage. This puts the patients at a higher risk of infections and complications like central stenosis in long term.

The catheter insertion related complications were very less (1.2%) in the study population probably due to the universal usage of ultrasound guidance for catheter insertion in our center as compared to that reported 4% (Range 0-18 %)[74].

Table 19: COMPARISION OF BACTEREMIA ASSOCIATED WITH NTDC USAGE (per 1000 NTDC days)

Current study	3.20
CDC report on central lines [75]	1.05
Cohen et al[76]	3.50
Nissenson AR[74]	6.20

The bacteremia episodes the NTDC users were comparable to that of many published literature. However the lowest published rate from USA[76] provides insights to the need for further improvement.

The spectrum of infectious agents causing the NTDC associated bacteremia was similar to that of many published literature[77] with Coagulase-negative staphylococci being the most common.

The NTDC are not recommended for usage above 21 days. Vascular access work group has further recommended converting NTDCs to TDCs if more than 1 week of HD is anticipated. However the median survival of NTDCs was 102.8 days with interquartile range (72-211 days) which reflect the delay in placement of permanent access in patient initiating on HD possibly because of the economic burden of RRT initiation. The factors contributing to the prolonged usage of NTDCs warrant further prospective studies in this regard. Inspite of the higher infecction rates in NTDC usage there was 80.8% NTDC survival at 45 days follow up.

CONCLUSIONS

AV FISTULAS:

1. Only 15.3% of patients initiated on maintenance haemodialysis had AVFs to begin with.
2. 91% of prevalent patients had AVF as the permanent vascular access.
3. Thrombosis was the most common AVF complication occurring in dialysis patients. AVF thrombosis rate is much higher among incident patients compared to western standards and requires further care for reduction of the rate.
4. **Incident patients:** No significant difference in access complications between pre-emptive and non pre-emptive groups. Distal AV fistulas had statistically significant better survival at one year as compared to the proximal AV fistulas. AVF patency at one year for distal AVF was 80.1% vs. proximal AVFs 68.1%.
5. **Prevalent patients:** Low incidences of access complications were observed. Diabetics had a low mean survival of fistulas at one year as compared to non-diabetics. AVF patency at one year for non-diabetics was 96.1% vs. diabetics 89.9%.

Tunnelled Dialysis Catheters:

1. All complications in TDCs were managed conservatively with 100% patency rate at 1 year.

2. Breakage was the most common TDC complication.

Non Tunnelled Dialysis Catheters:

1. Infection was the most common NTDC complication.
2. NTDCs had higher infection rates as compared to other forms of vascular access.
3. 45 days survival of NTDC was 80.8%.

LIMITATIONS

1 Nutritional assessment and quality of life were not studied which are shown to affect vascular access outcomes and vice versa in certain studies could have been studied.

2 Surgical aspects of AVF creation were not studied.

3 Preoperative vascular studies were not compared with access outcomes.

4 Detailed inclusion of biochemical parameters was not done. Various molecular factors[78] like hypoxia-regulated hypoxia-inducible factor-1 (HIF-1α), vascular endothelial growth factor A (VEGF-A), and matrix metalloproteinases (MMPs) are found useful in predicting AVF failure which were not considered in the current study in view of financial and time constraints.

BIBLIOGRAPHY

1. Eggers PW. Has the incidence of end-stage renal disease in the USA and other countries stabilized? Curr Opin Nephrol Hypertens 2011; 20: 241-245
2. Santoro A, Canova C, Freyrie A, Mancini E. Vascular access for hemodialysis. J Nephrol 2006; 19: 259-264
3. United States Renal Data System. 2002 Annual Data Report. Bethesda: National Institutes of Health, National Institute of Diabetes and Digestive Diseases, 2002
4. Metcalfe W, Khan IH, Prescott GJ, Simpson K, Macleod AM, on behalf of the Scottish Renal Registry: hospitalization in the first year of renal replacement therapy for end-stage renal disease. QJM 2003;96:899–909.
5. Schon D, Blume WS, Niebauer K, Hollenbeak CS, de Lissovoy G: Increasing the use of arteriovenous fistula in hemodialysis: economic benefits and economic barriers. Clin J Am Soc Nephrol 2007;2:268–276.
6. Scribner BH. Medical dilemmas: the old is new. Nat Med 2002;8:1066–1067.
7. Ortega T, Ortega F, Diaz-Corte C, Rebollo P, Ma Baltar J, Alvarez-Grande J: The timely construction of arteriovenous fistulae: a key to reducing morbidity and mortality and to improving cost management. Nephrol Dial Transplant 2005;20:598–603.
8. Rayner, H. C. *et al*. Vascular access results from the Dialysis Outcomes and Practice Patterns Study (DOPPS): performance against Kidney Disease

Outcomes Quality Initiative (K/DOQI) Clinical Practice Guidelines. *Am. J. Kidney Dis.* 44, 22–26 (2004).

9. Department of Health & Human Services Centers for Medicare & Medicaid Services.

   CMS launches "Fistula First" initiative to improve care and quality of life for hemodialysis patients [online], http://www.esrdnetwork18.org/pdfs/ QI%20-%20FF%20Breakthrough%20Initiative/CMSPressRelease.pdf (2004).

10. Lych, J. R., Mohan, S. & McClellan, W. M.Achieving the goal: results from the Fistula First Breakthrough Initiative. *Curr. Opin. Nephrol. Hypertens.* 20, 583–592 (2011).

11. Varughese S, John GT, Alexander S, Deborah MN, Nithya N, Ahamed I, *et al*. Pre-tertiary hospital care of patients with chronic kidney disease in India. Indian J Med Res 2007;126:28-33.

12. Swarnalatha G, Ram R, Prasad N, Dakshinamurty KV. Endstage renal disease patients on hemodialysis: a study from a tertiary care center in a developing country. Hemodial Int 2011; 15: 312-319

13. Jaboulay M, Briau E. Recherches expe´ rimentelles sur la suture et la greffe arte´ rielles. Lyon Me´d 1896; 81: 97–99

14. Carrel A. Technique and remote results of vascular anastomoses. Surg Gynecol Obstet 1912; 14: 246–254

15. Kolff WJ. First clinical experience with the artificial kidney. Ann Int Med 1965; 62: 608–619

16. Shaldon S, Chiandussi L, Higgs B. Haemodialysis by percutaneous catheterization of the femoral artery and vein with regional heparinization. Lancet 1961; II: 857–859

17. Shaldon S. Percutaneous vessel catheterization for hemodialysis. ASAIO J 1994; 40: 17–19

18. Dotter CT, Judkins MP, Rosch J. Nonoperative treatment of arterial occlusive disease. A radiologically facilitated technique. Radiol Clin N Am 1967; 5: 531–542

19. Erben J, Kvasnicka J, Bastecky J, Vortel V. Experience with routine use of sucblavian vein cannulation in haemodialysis. Proc EDTA 1969; 6: 59–64

20. Schillinger F, Schillinger D, Montagnac R, Milcent T. Post catheterization vein stenosis in haemodialysis: comparative angiographic study of 50 subclavian and 50 internal jugular accesses. Nephrol Dial Transplant 1991; 6: 722–724

21. Chinitz JL, Yokoyama T, Bower R, Swartz C. Self-sealing prosthesis for arteriovenous fistula in man. Trans Am Soc Artif Intern Organs 1972; 18: 452–455

22. Dunn I, Frumkin E, Forte R, Raquena R, Levowitz BS. Dacron velour vascular prosthesis for hemodialysis. Proc Clin Dial Transplant Forum 1972; 2: 85

23. Baker LD Jr, Johnson JM, Goldfarb D. Expanded polytetrafluoroethylene (PTFE) subcutaneous arteriovenous conduit: an improved vascular access for chronic hemodialysis. Trans Am Soc Artif Intern Organs 1976; 22: 382–387

24. Polo JR, Sanabia J, Garcia-Sabrido JL, Luno J, Menarguez C, Echenagusia A. Brachial-jugular polytetrafluoroethylene fistulas for hemodialysis. Am J Kidney Dis 1990; 16: 465–468

25. Ergun DL, Mistretta CA, Kruger RA, Riederer SJ, Shaw CG, Carbone DP. A hybrid computerized fluoroscopy technique for noninvasive cardiovascular imaging. Radiology 1979; 132: 739–742

26. Brittinger WD, Strauch M, Huber W et al. 16 months experience with the subcutaneously fixed superficial femoral artery for chronic haemodialysis. Proc EDTA 1970; 7: 408–412

27. Philibert D, et al. Clinical experience with a chronic hemodialysis catheter with symmetrical tip configuration (Palindrome TM). J Am Soc Nephrol 2005;16:455A.

28. Clark EG, Barsuk JH. Temporary hemodialysis catheters: recent advances. Kidney Int. 2014 Nov;86(5):888–95.

29. Vats HS. Complications of catheters: tunneled and nontunneled. Adv Chronic Kidney Dis 2012; 19: 188–194.

30. Rabindranath KS, Kumar E, Shail R et al. Use of real-time ultrasound guidance for the placement of hemodialysis catheters: a systematic review and meta-analysis of randomized controlled trials. Am J Kidney Dis 2011; 58: 964–970.

31. Prabhu MV, Juneja D, Gopal PB et al. Ultrasound-guided femoral dialysis access placement: a single-center randomized trial. Clin J Am Soc Nephrol 2010; 5: 235–239.

32. Allon M. Dialysis catheter-related bacteremia: treatment and prophylaxis. Am J Kidney Dis 2004;44:779-791.

33. Safdar N, Fine JP, Maki DG. Meta-analysis: methods for diagnosing intravascular device-related bloodstream infection. Ann Intern Med 2005; 142:451.

34. Blot F, Schmidt E, Nitenberg G, et al. Earlier positivity of central-venous- versus peripheral-blood cultures is highly predictive of catheter-related sepsis. J Clin Microbiol 1998; 36:105.

35. Irwig L, Tosteson AN, Gatsonis C, et al. Guidelines for meta-analyses evaluating diagnostic tests. Ann Intern Med 1994; 120:667.

36. Kovalik EC, et al. A clustering of epidural abscesses in chronic hemodialysis patients: risks of salvaging access catheters in cases of infection. J Am Soc Nephrol 1996;7:2264-2267.

37. Maki DG, Kluger DM, Crnich CJ. The risk of bloodstream infection in adults with different intravascular devices: a systematic review of 200 published prospective studies. Mayo Clin Proc 2006; 81: 1159–1171.

38. O'Grady NP, Alexander M, Burns LA et al. Guidelines for the prevention of intravascular catheter-related infections. Am J Infect Control 2011; 39(4 Suppl 1): S1–34.

39. Maki DG, Ash SR, Winger RK et al. Investigators AT. A novel antimicrobial and antithrombotic lock solution for hemodialysis catheters: a multi-center, controlled, randomized trial. Crit Care Med 2011; 39: 613–620.
40. Kim SH, Song KI, Chang JW et al. Prevention of uncuffed hemodialysis catheter-related bacteremia using an antibiotic lock technique: a prospective, randomized clinical trial. Kidney Int 2006; 69: 161–164.
41. Campos RP, do Nascimento MM, Chula DC et al. Minocycline-EDTA lock solution prevents catheter-related bacteremia in hemodialysis. J Am Soc Nephrol 2011; 22: 1939–1945.
42. Zhao Y, Li Z, Zhang L et al. Citrate versus heparin lock for hemodialysis catheters: a systematic review and meta-analysis of randomized controlled trials. Am J Kidney Dis 2014; 63: 479–490.
43. Filiopoulos V, Hadjiyannakos D, Koutis I et al. Approaches to prolong the use of uncuffed hemodialysis catheters: results of a randomized trial. Am J Nephrol 2011; 33: 260–268.
44. Schindler R, Heemann U, Haug U et al. Bismuth coating of nontunneled haemodialysis catheters reduces bacterial colonization: a randomized controlled trial. Nephrol Dial Transplant 2010; 25: 2651–2656.
45. Huang SS, Septimus E, Kleinman K et al. Targeted vs. universal decolonization to prevent ICU infection. N Engl J Med 2013; 368: 2255–2265.

46. 1.
47. Feddersen MA, Roger SD. Arteriovenous fistula surveillance: everyone's responsibility. Portuguese Journal of Nephrology & Hypertension. 2012 Oct;26(4):255–65.
48. Manson, R. J. *et al.* Arteriovenous fistula creation using the Optiflow vascular anastomosis device: a first in man pilot study. *Semin. Dial.* 26, 97–99 (2013).
49. Katzman HE, McLafferty RB, Ross JR, Glickman MH, Peden EK, Lawson JH. Initial experience and outcome of a new hemodialysis access device for catheter-dependent patients. J Vasc Surg. 2009 Sep;50(3):600–7, 607.e1.
50. Gore. *GORE® Hybrid Vascular Graft* [online], http://www.goremedical.com/hybrid (2013).
51. Paulson, W. D. *et al.* Safety and efficacy of local periadventitial delivery of sirolimus for improving hemodialysis graft patency: first human experience with a sirolimus-eluting collagen membrane (Coll-R). *Nephrol. Dial. Transplant.* 27, 1219–1224 (2012).
52. Katsanos, K. *et al*. Drug-coated balloon angioplasty in hemodialysis access. Presented at the 2011 38th Annual Symposium onVascular and Endovascular Issues, Techniques and Horizons (VEITHsymposium).
53. Rotmans, J. I. *et al.* Sirolimus-eluting stents to abolish intimal hyperplasia and improve flow in porcine arteriovenous grafts: a 4-week follow-up study. *Circulation* 111, 1537–1542 (2005).
54. Tay, K. *et al.* Prospective randomised controlled trial comparing drug eluting stent (DES) versus percutaneous transluminal angioplasty (PTA) for the

treatment of hemodialysis arterio-venous graft (AVG) stenoses: preliminary report [abstract 7]. *J. Vasc. Interv. Radiol.* 22 (Suppl.), S6 (2011).

55. Dahl, S. L. *et al.* Readily available tissue- engineered vascular grafts. *Sci. Transl. Med.* 3, 68ra9 (2011).

56. Peden, E. K. *et al.* A multi-center, dose-escalation study of human type I pancreatic elastase (PRT-201) administered after arteriovenous fistula creation. *J. Vasc. Access* http:// dx.doi.org/10.5301/jva.5000125.

57. Agarwal SK, Dash SC. Spectrum of renal diseases in Indian adults. J Assoc Physicians India. 2000;48:594-600.

58. Mittal S, Kher V, Gulati S, Agarwal LK, Arora P. Chronic renal failure in India. Ren Fail. 1997;19:763-70.

59. Sakhuja V, Jha V, Ghosh AK, Ahmed S, Saha TK. Chronic renal failure in India. Nephrol Dial Transplant. 1994;9:871- 2.

60. Mani MK. Chronic renal failure in India. Nephrol Dial Transplant. 1993;8: 684-9.

61. M Rao, R Juneja, R B Shirly, C K Jacob. *Haemodialysis for end-stage renal disease in Southern India--a perspective from a tertiary referral care centre.*, Nephrology Dialysis Transplantation, 1998, 2494-2500

62. Ballal HS, Anandh U. Haemodialysis in India. Nephrol Dial Transplant. 1999;14:2779.

63. Mendelssohn DC, Ethier J, Elder SJ, Saran R, Port FK, Pisoni RL. Haemodialysis vascular access problems in Canada: results from the Dialysis

Outcomes and Practice Patterns Study (DOPPS II). Nephrol Dial Transplant. 2006;21:721-8.

64. Hemodialysis Adequacy 2006 Work Group. Clinical practice guidelines for hemodialysis adequacy, update 2006. Am J Kidney Dis. 2006 Jul;48 Suppl 1:S2–90.

65. Jindal K, Chan CT, Deziel C, Hirsch D, Soroka SD, Tonelli M, et al. CHAPTER 4: Vascular Access. JASN. 2006 Mar 1;17(3 suppl 1):S16–23.

66. O'Brien FJ, Kok HKT, O'Kane C, McWilliams J, O'Kelly P, Collins P, et al. Arterio-venous fistula buttonhole cannulation technique: a retrospective analysis of infectious complications. Clin Kidney J. 2012 Dec 1;5(6):526–9.

67. Stolic R. Most Important Chronic Complications of Arteriovenous Fistulas for Hemodialysis. Medical Principles and Practice. 2013;22(3):220–8.

68. Schumacher KA, Walker B, Weidenmaier W, Friedrich JM. Venous occlusions distant to the shunt as malfunction factors during hemodialysis [in German]. Rofo. 1989;150:198-201.

69. Yevzlin AS. Hemodialysis catheter-associated central venous stenosis. Semin Dial. 2008 Dec;21(6):522–7.

70. Ohira S, Kon T, Imura T. Evaluation of primary failure in native AV-fistulae (early fistula failure). Hemodial Int. 2006 Apr;10(2):173–9.

71. Gowda A, Pavan M, Babu K. Vascular access profile in maintenance hemodialysis patients. Iran J Kidney Dis. 2014 May;8(3):218–24.

72. Huijbregts HJT, Bots ML, Wittens CHA, Schrama YC, Moll FL, Blankestijn PJ, et al. Hemodialysis arteriovenous fistula patency revisited: results of a prospective, multicenter initiative. Clin J Am Soc Nephrol. 2008 May;3(3):714–9.

73. Sampathkumar K, Ramakrishnan M, Sah AK, Sooraj Y, Mahaldhar A, Ajeshkumar R. Tunneled central venous catheters: Experience from a single center. Indian J Nephrol. 2011 Apr;21(2):107–11.

74. Nissenson AR, Fine RN, editors. Handbook of dialysis therapy. 4th ed. Philadelphia: Saunders/Elsevier; 2008. 1583 p.

75. CDC (Centers for Disease Control and Prevention). Vital signs: central line–associated bloodstream infections – United States, 2001, 2008, and 2009. *MMWR Morb Mortal Wkly Rep*. 2011;60:243–248.

76. Cohen AB, Dagli M, Stavropoulos SW Jr, et al. Silicone and polyurethane tunneled infusion catheters: a comparison of durability and breakage rates. *J Vasc Interv Radiol*. 2011;22(5):638–641.

77. Pantelias K, Grapsa E. Vascular access today. World J Nephrol. 2012 Jun 6;1(3): 69–78.

78. Duque JC, Vazquez-Padron RI. Myofibroblasts: the ideal target to prevent arteriovenous fistula failure? Kidney Int. 2014 Feb;85(2):234–6.

ANNEXURES

1. Proforma-Questionnaire
2. Informed consent-English
3. Informed consent-Tamil
4. Copy of the master chart (The excel sheet has been minified due to large number of parameters. The data sheet can be clearly visualized in the soft copy submitted along with the PDF format).

Maintenance HD study

Name: **Age:** **Sex:**

Hospital Number:

Address: **Phone:**

email:

Date of intiation of HD:

Initiated in CMC Y/N

Financial support: Self paid /company paid /insurance

Socioeconomic status:

Family income/month	score
≥34830	12
17415-34829	10
13029-17414	6
8707-13028	4
5224-8706	3
1744-5223	2
≤1743	1

Education	***Ed.score***	***Occupation***	***score***
Professional or honours	7	profession	10
Graduate/ postgraduate	6	Semiprofession	6
Intermediate or post high school diploma	5	Clerical. farmer,shop owner	5
High school	4	Skilled worker	4
Middle school	3	Semi skilled worker	3
Primary school	2	Unskilled worker	2
Illiterate	1	unemployed	1

Vascular access

Date of initiation:

Intial modality of dialysis HD/CAPD

Frequency of dialysis 2/3/>3 Average interdialytic weight gain

Residual urine output

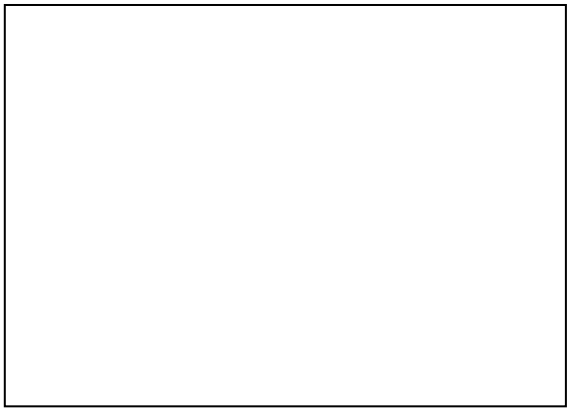
Previous blood transfusions Total External Internal Filter/CsA

Access history:

1.

2.

3.



Access diagram

Doppler before AVF

Post AVF dysfunction Doppler

Fistulogram

Date / Time												
BP- Pre HD												
BP – Post HD												
Blood Flow												
Dialysate flow												
Cummulative blood flow												
AP												
VP Dynamic (Static)												
TMP												
Heparinization												
Duration												
Kt/V												
Needle size												
Dialyser surface area												
Dialyser type												
Blood transfusion												
EPO type												
EPO dose												

EPO compliance												
Session specific complications												
IVIron supplementation												

Co-morbidities

Co-morbidity	**Present**	**Absent**	**Duration if present**
Diabetes Mellitus			
Hypertension			
IHD			
CVD			
COPD/Asthma			
Prothrombotic state			
Others			

PERSONAL HISTORY

Married Yes/No How long:
Number of children
Smoking Yes/No Pack years:
Alcohol Yes/No Frequency, quantity, duration:
Drug abuse
Allergies

DRUG HISTORY

Hepatitis B vaccination status:
Current drug list:

Any other issues

MONTHLY REVIEW QUESTIONAIRE
(please tick and proceed with appropriate workup)

Month												
Recent IHD symptoms ECG changes CAG/PCI/CABG												
Recent CVA												
Change in antiplatelet agents												
Recent HT emergencies												
Number of antihypertensive medicines												
Syncopal attacks												
Chronic cough/sputum/haemoptysis												
Haematuria												
LUTs												
Recent UTI												
Chronic diarrhoea												
Recent GI bleed												
Interdialytic wt gain												
Dry weight												
Residual urine output												
Dialysis related problems Hypotension Cramps Flow problems Hypertension Dialyser clotting												
Recent access problems												
Recent blood transfusion												
Filter used												
Recent infection												
Recent surgery												
Abnormal bleeding PV												
On thrice weekly HD												

Hospitalization

1.

2.

3.

EXAMINATION

MONTH												
Weight												
BP (supine) (standing)												
Pallor												
Icterus												
LAP												
Pedal edema												
Peripheral pulses DP/PT/Pop/Femoral/ radial/brachial/carotid												
Bruits												
Chest												
CVS												
P/A												
Breasts												
Thyroid												
AVF/Graft Limb edema Bruit pitch Collaterals												
CNS												

MONTHLY INVESTIGATIONS

MONTH												
Hb												
URR												
AC/PC												
Pre/post Urea												
Creatinine												
Na/K/HCO3												
Ca/P												

LFT												
Kt/V												

TRIMESTERLY INVESTIGATIONS

MONTH				
PTH				
S iron/TIBC Ferritin				
TC				
DC				
Platelets				
BBVS				

6 MONTHLY INVESTIGATIONS

MONTH		
AntiHBc		
HBV PCR		
HCV PCR		
ECG		
Echo		
USG Abd		
X ray KUB		
FOB x 3		
PRA		
Lipid profile		

YEARLY INVESTIGATIONS

Anti HBs	
TSH	
Iliofemoral doppler	

Informed Consent Form for Subjects

Study Title: "Morbidity and mortality among incident and prevalent maintenance hemodialysis patients – a one year prospective observational study "

Study Number: _____

Subject's Initials: _____ Subject's Name: _____

Date of Birth / Age: _____ Subject phone no: _____

The research study with the title given above has been explained to me. Its purpose is to look for the 1 year outcome in maintenance hemodialysis patients . This study will use data and samples from the clinical workstation.

The expected duration of participation will be approximately 20 minutes at enrollment and then subsequently during visits for regular hemodialysis for the following 1 year. Height and weight measurements of will be taken and I will be assessed by a doctor. There will be no samples taken or no other tests will be done for the study.

No risk or discomfort beyond those of a normal physical examination are expected. If the clinical and laboratory parameters suggest I will be recommended for necessary treatment. No other direct benefits are expected from this study.

My records will be kept confidential and only the study investigators, and if needed, the committee at CMC that oversees research will have access to the data. No personal identification will be used in any report of the study.

This study has no treatment testing, and no injury is expected or provided for by the investigator or the institution.

I am free to participate in the study or not, and I am aware that I can choose to withdraw at any time. Refusal to participate will not involve any penalty or loss of benefits to which I am otherwise entitled.

(i) I confirm that I have read and understood the information sheet dated _____ for the above study and have had the opportunity to ask questions.

(ii) I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.

(iii) I understand that the Sponsor of the clinical trial, others working on the Sponsor's behalf, the Ethics Committee and the regulatory authorities will not need my permission to look at my health records both in respect of the current study and any further research that may be conducted in relation to it, even if I

withdraw from the trial. I agree to this access. However, I understand that my identity will not be revealed in any information released to third parties or published.

(iv) I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s).

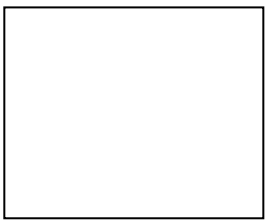
(v) I agree to take part in the above study.

Signature (or Thumb impression) of the Subject/Legally Acceptable

Date: _____/_____/_____

Signatory's Name: _____ Signature:

Or



Representative: _____

Date: _____/_____/_____

Signatory's Name: _____

Signature of the Investigator: _____

Date: _____/_____/_____

Study Investigator's Name: _____

Signature of the Witness: _____

Date: _____/_____/_____

Name & Address of the Witness: _____

நோயாளியின் தகவல் படிவம்

ஹீமோடயாலிஸிஸை சார்ந்திருக்கும் நோயாளிகளுக்கு வரப்போகிற ஒருவருட காலத்தில் நேரிட கூடிய இறப்பு மற்றும் நோயின் பாதிப்பினால் உண்டாகும் ஆரோக்கியம் குன்றிய தன்மையின் எதிர்கால கவனிப்பு ஆராய்ச்சி.

பிரதான ஆராய்ச்சியாளர் : டாக்டர்.பிதுன் குரியோகோஸ் பௌலோஸ், சீனியர் பீ.ஜி ரெஜிஸ்ட்ரார். சிறுநீரக துறை பிரிவு, சி.எம்.சி. மருத்துவமனை, வேலூர்.

ஹீமோ டயாலிஸிஸ் என்பது சிறுநீரகம் செயல் இழந்தவர்களுக்கு மேற்கொள்ளப்படும் பாதுகாப்பான சிகிச்சை முறைகளும் ஒன்றாகும். ஹீமோ டயாலிஸிஸ் மேற்கொள்ளும் இந்திய நோயாளிகளின் மத்தியில் அவர்களின் எஞ்சிய வாழ்வு மற்றும் அவர்களின் நல்வாழ்வு நிகழ்வுகள் பற்றி. சரியான ஆராய்ச்சிகள் செய்யப்படவில்லை. வரும் ஒரு ஆண்டு கால அளவில் ஏ.கே. லேபில் ஹீமோ டயாலிஸிஸ் செய்து கொள்ளும் வயது வந்த நோயாளிகளின் மருத்துவ மற்றும் இரத்த பரிசோதனை முடிவுகளை வைத்து ஆராய்ச்சி மேற்கொள்வதே இந்த ஆராய்ச்சியின் நோக்கம்.

நாங்கள் உங்களையும் உங்களை போல் மூன்று மாதங்கள் அல்லது அதற்கு மேலாக ஏகேலேபில் ஹீமோ டயாலிஸிஸ் செய்து கொள்ளுபவரையும் இந்த ஆராய்ச்சியில் உட்படுத்த விரும்புகிறோம். இந்த ஆராய்ச்சியில், ஏ.கே.லேப், சி.எம்.சி. சிறுநீரக துறை பிரிவின் நடைமுறையில் இல்லாத எந்த ஒரு புது மருந்துகளோ, அல்லது பரிசோதனைகளோ, உபயோகப்படுத்தமாட்டோம். இந்த ஆராய்ச்சியில் பங்கெடுப்பது உங்களின் சுயவிருப்பம். உங்களின் முடிவு உங்களின் சிகிச்சையை எந்த விதத்திலும் பாதிக்காது.

இந்த ஆராய்ச்சியில் நீங்கள் பங்கேற்க முடிவு செய்தால் உங்களை ஆராய்ச்சி செய்பவர் நேர்காணல் மற்றும் மருத்துவ பரிசோதனையும் செய்வார். சீனியர் டயாலிஸிஸ் தெரப்பிஸ்ட் உங்கள் வாஸ்குலர் ஆக்சஸை (சுந்தீட்ட / ஃபிஸ்டுலா) மாதமொரு முறை பரிசோதனை செய்து, அதன் முடிவை ஏகேலேப் மருத்துவரிடம் தெரிவிப்பார். டயாலிஸிஸ் நேரத்தின் நிகழ்வுகளை மருத்துவரிடம் தெரிவிப்பார். நர்ஸ் எஜுகேட்டர் (Nurse Educator) மாதமொரு முறை உங்களை சந்தித்து, உணவு பழக்கம் மற்றும் கட்டுப்பாடு பற்றி சொல்லிக்கொடுப்பார். ஆராய்ச்சிக்காக எந்த ஒரு புது இரத்த பரிசோதனையும் செய்யப்படமாட்டாது. ஆனால் ஏகேலேபில் நடைமுறையில் உள்ள, மாதமொருமுறை மற்றும் மூன்று மாதங்களுக்கு ஒருமுறை செய்யப்படும் பரிசோதனை மட்டுமே செய்யப்படும்.

இரத்த பரிசோதனையின் முடிவினை பார்த்து உங்களின் வழக்கமான மருந்துகளின் விளைவினை காணமுடியும். இந்த ஆராய்ச்சியில் கண்டுபிடிக்கப்படும் முடிவினால், இந்தியாவில் சிறுநீரகச் செயலிழப்பினால் ஹீமோ டயாலிஸிஸ் மேற்கொள்ளுபவர்கள் பற்றிய ஒரு விழிப்புணர்வை சக மக்களுக்கு ஏற்படுத்த முடியும்.

ஆராய்ச்சியில் பங்கேற்பவரின் தகவல் ஒப்புதல் படிவத்தின் வடிவம்

ஆராய்ச்சியின் தலைப்பு :

"ஹீமோடயாலிஸிஸை சார்ந்திருக்கும் நோயாளிகளுக்கு வரப்போகிற ஒருவருட காலத்தில் நேரிடக்கூடிய இறப்பு மற்றும் நோயின் பாதிப்பினால் உண்டாகும் ஆராக்கியம் குன்றிய தன்மையின் எதிர்கால கவனிப்பு ஆராய்ச்சி"

ஆய்வு எண் : _____

பங்கேற்பவரின் பெயர்ச்சுருக்கம் : _____பெயர் : _____

பிறந்த தேதி / வயது : _____ போன் : _____

மேற்கூறப்பட்டுள்ள இந்த ஆராய்ச்சி எனக்கு விளக்கப்பட்டது. இந்த ஆராய்ச்சியின் நோக்கமானது ஹீமோடயாலிஸிஸை சார்ந்திருக்கும் நபரின் ஒரு வருட கால அளவில் அவரது உடலில் ஏற்பட்ட விளைவுகளை பற்றி அறிவதாகும். இந்த ஆராய்ச்சியில் கம்ப்யூட்டரில் பதிவு செய்துள்ள சோதனை முடிவுகள் பயன்படுத்தப்படும்.

இந்த ஆராய்ச்சியில் பங்குகொள்ள, முதலில் பதிவு செய்யும் போது, ஒவ்வொரு முறை ஹீமோடயாலிஸிஸ் செய்யவரம் போது 1 வருட கால அளவிற்கு ஒவ்வொரு முறையும் 20 நிமிடங்கள் செலவிட வேண்டும். உடல் எடை மற்றும் உயரம் அளவிடப்பட்டு மருத்துவரால் மருத்துவ பரிசோதனை செய்யப்படும். இந்த ஆராய்ச்சிக்காக தனியாக எந்த ஒரு இரத்த பரிசோதனையோ வேறு சோதனையோ செய்யப்படமாட்டாது.

இந்த ஆராய்ச்சியில் சாதாரண மருத்துவ பரிசோதனை மட்டுமே செய்யப்படும். இதனால் எந்த ஆபத்தோ, அசௌகரியமோ எனக்கு ஏற்படாது. எனக்கு பரிந்துரைக்கப்படும் பரிசோதனைகள் என்னுடைய சிகிச்சைக்கு மட்டுமே பயன்படுமே ஒழிய அதனால் வேறு யாருக்கும் எந்த பலனும் கிடையாது.

இந்த ஆராய்ச்சிக்காக பதிவு செய்யப்படும் என்னைப் பற்றிய எல்லா குறிப்புகளும் இரகசியமாக பாதுகாக்கப்படும். தேவைப்பட்டால் மட்டுமே இந்த ஆராய்ச்சியினை மேற்பார்வை பார்க்கும் சி.எம்.சி. மருத்துவமனை ஆராய்ச்சிக்கு சேகிக்கப்பட்ட குறிப்புகளை பார்க்க நேரிடும். என் சொந்த பெயர் மற்றும் அடையாளம் இந்த ஆராய்ச்சியின் அறிக்கையில் வெளியிடப்படமாட்டாது.

இந்த ஆராய்ச்சியில் பங்கேற்பவர்கு எந்த ஒரு சிகிச்சை முறை பரிசோதனையோ அல்லது காயமோ ஆராய்ச்சி செய்பவராலோ அல்லது நிறுவனத்தாலோ ஏற்படாது.

இந்த ஆராய்ச்சியில் என் சுயவிருப்பத்தின்படி பங்கேற்கிறேன். தேவைப்பட்டால் இந்த ஆராய்ச்சியில் இருந்து எந்த நேரத்திலும் விலகிகொள்ளலாம். இந்த ஆராய்ச்சியில் பங்கேற்க மறுப்பதாலோ அல்லது விலகி கொள்ளுவதாலோ எனக்கு எந்த ஒரு லாபமோ நஷ்டமோ ஏற்படாது.

i) நான்_____அன்று இந்த தகவல் அறிக்கையை வாசித்து புரிந்து கொண்டேன். இந்த ஆராய்ச்சியைப் பற்றிய கேள்விகளை கேட்க எனக்கு வாய்ப்பு அளிக்கப்பட்டதென்று உறுதி கூறுகிறேன்.

ii) நான் இந்த ஆராய்ச்சியில் என் சயவிருப்பத்தின்படி பங்கேற்கிறேன். என்னுடைய மருத்துவ சிகிச்சை மற்றும் சட்ட உரிமை பாதிக்கப்படாமல் இந்த ஆராய்ச்சியிலிருந்து விலகிக் கொள்ளலாம் என்று புரிந்துக் கொள்கிறேன்.

iii) இந்த ஆராய்ச்சியின் ஆதரவாளரும், இதற்காக அவருடன் வேலை செய்பவரும், மருத்துவ வரைமுறை குழு மற்றும் ஒழுங்குமுறை கவனிப்பவரும் இந்த ஆராய்ச்சியின் என்னைச் சார்ந்த மருத்துவ குறிப்பேட்டை பார்ப்பதற்கும், அதை இந்த ஆராய்ச்சிக்காகவோ, இதை சார்ந்த வேறு ஒரு ஆராய்ச்சிக்காகவோ பயன்படுத்த நான் இந்த ஆராய்ச்சியில் பங்கேற்றாலோ அல்லது விலகி கொண்டாலோ என் அனுமதி தேவையில்லை என்று புரிந்து கொள்கிறேன். எந்த ஒரு ஆராய்ச்சி சார்ந்த தகவலை மூன்றாம் மனிதர்களுக்கு தெரிவித்தாலோ அல்லது புத்தகத்தில் வெளியிட்டாலோ என்னுடைய அடையாளம் வெளியே தெரியாது என்று புரிந்து கொள்கிறேன்.

iv) இந்த ஆராய்ச்சியில் அறிவியல் சார்ந்த குறிக்கோள் இருப்பதால், ஆராய்ச்சியிலிருந்து வெளிவருகிற குறிப்புகளையோ அல்லது முடிவையோ நான் தடை செய்யமாட்டேன்.

நான் இந்த ஆராய்ச்சியில் பங்கேற்க உறுதி அளிக்கிறேன்.

ஆராய்ச்சியில் பங்கேற்பவரின் / சட்டத்தால் அங்கீகரிக்கப்பட்டவரின் கையொப்பம் / கைநாட்டு

தேதி : _____/_____/_____

கையொப்பம் இடுபவரின் பெயர் : _____கையொப்பம்_____

அல்லது

பிரதிநிதி (ரெப்ரசன்டேட்டிவ்) : _____

தேதி : _____/_____/_____

கையொப்பம் இருபவரின் பெயர் : _____

ஆராய்ச்சியாளரின் பெயர் : _____

தேதி : _____/_____/_____

ஆய்வு ஆராய்ச்சியாளரின் பெயர் : _____ PHONE NUMBER: 9524849883

சாட்சி கையொப்பம் : _____

தேதி : _____/_____/_____

சாட்சியின் பெயர் மற்றும் விலாசம் :

Serial.	Inci.	Roll.no	Name	H.No	Age	Sex	Height	Weight	BMI	Domicile	NKD	DOactualinitia	DOinitation@er
1	0	1	Aasma Kha	623016D	48	0	149	52	23.4	Bihar	Obst.Uropa	17-Aug-13	17-Aug-13
10	0	12	Elakiya	657950F	25	0	150	38	16.9	Tamil Nadu	Unknown	1-Jun-13	1-Jun-13
100	1	113	Manjula	018934D	63	0	153	46	19.7	Andhra Pra	DN	22-Apr-13	1-Aug-13
101	1	115	Mary	305632A	55	0	146	45	21.1	Tamil Nadu	Unknown	20-Dec-12	1-Aug-13
102	1	117	Mina Rani I	633420D	48	0	155	58	24.1	Tripura	Unknown	29-Oct-12	1-Aug-13
103	1	118	Mohan K	639356D	65	1	158	55	22	Tamil nadu	DN	26-May-12	1-Aug-13
104	1	210	Moorthy P.	611580F	65	1	154	51	21.5	Tamil Nadu	DN	1-Apr-13	1-Aug-13
105	1	119	Moorthy.R.	125302F	65	1	159	50	19.8	Tamil Nadu	Unknown	4-Feb-12	1-Aug-13
106	1	120	Munusamy	289496F	42	1	161	70	27	Tamil nadu	DN	10-Sep-12	1-Aug-13
107	1	121	Najeeb AK	290368F	59	1	158	52	20.8	Tamilnadu	DN	15-Nov-12	1-Aug-13
108	1	122	Nanadhaku	151458B	47	1	160	51	19.9	Tamil nadu	HTNsive ne	22-Oct-11	1-Aug-13
109	1	123	Nandeeshv	594308D	37	1	171	55	18.8	Andhra pra	CGN	2-Jan-10	1-Aug-13
11	0	13	Ganesan S	334488C	68	1	165	70	25.7	Tamil nadu	DN	27-Sep-13	27-Sep-13
110	1	126	Narayanasv	376529D	61	1	162	65	24.8	Tamil Nadu	Unknown	23-Dec-08	1-Aug-13
111	1	128	Nawab Kha	498278D	63	1	166	61	22.1	Tamil Nadu	HTNsive ne	15-Aug-11	1-Aug-13
112	1	129	Nazeer bas	237386F	63	1	157	53	21.5	Tamil Nadu	Unknown	5-Sep-12	1-Aug-13
113	1	130	Neeraja R	201127C	30	0	162	53	20.2	Tamil Nadu	LN	9-Oct-09	1-Aug-13
114	1	131	Nelson Nee	740293D	58	1	173	80	26.7	Tamil Nadu	DN	17-Aug-12	1-Aug-13
115	1	132	Pandyan G	392239D	61	1	170	68	23.5	Tamil Nadu	DN	20-Jan-09	1-Aug-13
116	1	25	Parasurama	348023	68	1	167	101	36.2	Tamil nadu	DN	23-Feb-11	1-Aug-13
117	1	133	Parvana Th	129727F	42	0	165	64	23.5	Tamil nadu	Unknown	20-May-12	1-Aug-13
118	1	134	Philip P	056407F	59	1	155	53	22.1	Kerala	Unknown	6-Jan-12	1-Aug-13
119	1	135	PMV Prasa	650191C	63	1	171	65	22.2	Tamil Nadu	DN	19-Dec-12	1-Aug-13
12	0	14	Ganesan B	089567F	24	1	165	79	29	Andhra	IgAN	23-Oct-13	23-Oct-13
120	1	137	Priyasee Pr	470202C	24	0	156	49	20.1	Jharkhand	CAN	8-Feb-12	1-Aug-13
121	1	139	Pushpa N	707536D	64	0	147	58	26.8	Tamil nadu	DN	29-Oct-11	1-Aug-13
122	1	141	RajathiMag	542960D	67	0	148	51	23.3	Tamil Nadu	CPN	14-Jan-12	1-Aug-13
123	1	142	Rajendran S	324603C	49	1	182	68	20.5	Tamil Nadu	Unknown	8-Jun-12	1-Aug-13
124	1	143	Rajeshwari	770084D	54	0	150	41	18.2	Tamil Nadu	Unknown	6-Sep-10	1-Aug-13
125	1	144	Rajiv Gandl	254898F	28	0	172	61	20.6	Tamil Nadu	Unknown	26-Jul-12	1-Aug-13
126	1	146	Ramanan S	145457F	56	1	161	58	22.4	Tamil Nadu	DN	8-Mar-12	1-Aug-13
127	1	147	Ramanatha	638841C	62	1	162	55	21	Tamil Nadu	DN	29-Jun-12	1-Aug-13

128	1	149	Ramu T	259547D	27	1	175	58	18.9	Andhra Pra	IgAN	2-Jan-09	1-Aug-13
129	1	150	Ranganath	472152D	55	1	165	59	21.7	Tamil Nadu	DN	8-Sep-12	1-Aug-13
13	0	15	Ganesh.S	687299F	43	1	164	47	17.5	Tamil nadu	Unknown	19-Oct-13	19-Oct-13
130	1	151	Rani	667289A	67	0	154	47	19.8	Tamil nadu	CIN	6-Feb-12	1-Aug-13
131	1	152	Riyaz Ahme	149339F	25	1	171	52	17.8	Tamil nadu	CGN	13-Mar-12	1-Aug-13
132	1	32	RobinRai	650207F	37	1	155	52	21.6	Bhutam	Unknown	24-Feb-13	1-Aug-13
133	1	154	Rosily	792405D	41	0	156	53	21.8	Tamil Nadu	Unknown	30-Jan-11	1-Aug-13
134	1	33	Sajal sunuv	470093F	17	1	170	63	21.8	West Beng	Unknown	30-Apr-13	1-Aug-13
135	1	156	Samuel Gn	303245C	68	1	151	62	27.2	Tamil Nadu	DN	17-May-11	1-Aug-13
136	1	158	Samuel Raj	601210A	75	1	162	61	23.2	Tamil Nadu	DN	8-Feb-13	1-Aug-13
137	1	160	Sangeetha	801557C	32	0	157	40	16.2	Tamil Nadu	Cortical Ne	15-Feb-09	1-Aug-13
138	1	162	Sankaran K	916569C	57	1	166	62	22.5	Tamil Nadu	DN	13-Jul-11	1-Aug-13
139	1	163	Savithri	957710B	56	0	150	63	28	Tamil Nadu	CPN	25-Aug-12	1-Aug-13
14	0	16	Girija	719607A	36	0	140	53	27	Tamil nadu	DN	2-Sep-13	2-Sep-13
140	1	164	Seenu	504000D	75	1	159	48	19	Andhra Pra	ADPKD	8-Dec-12	1-Aug-13
141	1	165	Selvam K	422321C	59	1	160	58	22.7	Tamil Nadu	DN	18-Mar-11	1-Aug-13
142	1	166	Selvanayag	818539B	69	0	146	58	27.2	Tamil Nadu	DN	16-Nov-12	1-Aug-13
143	1	167	Selvaraj	697686B	61	1	166	60	21.8	Tamil Nadu	DN	15-Dec-08	1-Aug-13
144	1	169	Settu P	451205C	64	1	159	52	20.6	Tamil Nadu	DN	23-Apr-12	1-Aug-13
145	1	170	Shafiullah	063217D	63	1	170	70	24.2	Tamil Nadu	DN	5-Nov-11	1-Aug-13
146	1	171	Shahul han	599611B	66	1	155	58	24.1	Tamil Nadu	DN	26-Jun-11	1-Aug-13
147	1	172	Shankar VG	111966F	53	1	168	57	20.2	Tamil Nadu	DN	28-Feb-12	1-Aug-13
148	1	173	Shanmugar	385639A	65	1	166	83	30.1	Tamil Nadu	DN	21-Oct-11	1-Aug-13
149	1	174	Shantha G	124066D	67	0	160	78	30.5	Tamil Nadu	DN	30-Mar-08	1-Aug-13
15	0	18	John	651646F	41	1	174	104	34.4	Tamil nadu	Unknown	23-Aug-13	23-Aug-13
150	1	175	Shanthi P	139344F	43	0	158	61	24.4	Tamil Nadu	LN	1-Mar-12	1-Aug-13
151	1	176	Shanthi M	098788F	55	0	149	43	19.4	Tamil Nadu	Unknown	24-Dec-11	1-Aug-13
152	1	177	Shanthi V	821394D	51	0	163	59	22.2	Tamil Nadu	DN	23-Nov-10	1-Aug-13
153	1	38	Sariffuddin	332113F	72	1	168	85	30.1	Assam	DN	3-Jan-13	1-Aug-13
154	1	178	Singari P	592541D	54	0	160	65	25.4	Tamil nadu	DN	22-Feb-11	1-Aug-13
155	1	179	Sivam NM	151318A	55	1	159	65	25.7	Tamil Nadu	DN	26-Mar-10	1-Aug-13
156	1	180	Soundaran	545444C	58	1	167	56	20.1	Tamil Nadu	CIN	9-Dec-09	1-Aug-13
157	1	181	Sreenivasal	212188D	56	1	170	73	25.3	Tamil Nadu	DN	31-Jan-12	1-Aug-13

158	1	182	Sridhar	647037A	57	1	164	64	23.8	Tamil Nadu	DN	28-Feb-13	1-Aug-13
159	1	183	Srinivasan I	147966F	71	1	164	47	17.5	Tamil Nadu	DN	8-Mar-12	1-Aug-13
16	0	94	Kamatchi	070350F	55	0	159	64	25.3	Tamil Nadu	Unknown	4-Jul-13	4-Jul-13
160	1	184	Stella Sama	974011B	61	0	150	60	26.7	Tamil Nadu	DN	8-Jan-09	1-Aug-13
161	1	188	Sugavana S	412434C	46	1	168	54	19.1	Tamil Nadu	DN	25-Dec-10	1-Aug-13
162	1	190	Sumathy G	424597D	41	0	154	70	29.5	Tamil Nadu	Unknown	8-Mar-12	1-Aug-13
163	1	192	Suresh R	149654F	26	1	160	48	18.7	Tamil Nadu	Unknown	29-Feb-12	1-Aug-13
164	1	194	Suyambhu	355166D	71	1	160	55	21.5	Tamil Nadu	Unknown	18-Nov-08	1-Aug-13
165	1	195	Tamal Karn	426140F	24	1	180	78	24.1	West Beng	CIN	19-Mar-13	1-Aug-13
166	1	197	Thirupathi	354906F	47	1	165	57	20.9	Tamil Nadu	CGN	26-Dec-12	1-Aug-13
167	1	198	Uday Megi	409926F	53	1	158	42	16.8	West Bena	DN	1-Jan-13	1-Aug-13
168	1	199	Velu KR	235534C	57	1	174	71	23.5	Tamil Nadu	DN	12-Mar-12	1-Aug-13
169	1	200	Vengatesar	099544F	38	1	173	65	21.7	Tamil Nadu	CGN	4-Feb-13	1-Aug-13
17	0	99	Kinga Wan	492570F	32	0	149	41	18.5	Bhutan	Unknown	1-Jun-13	1-Jun-13
170	1	201	Venkatarar	833216C	75	1	173	79	26.4	Andhra	Unknown	6-Jun-06	1-Aug-13
171	1	202	Venkatesar	862061B	82	1	152	49	21.2	Tamil Nadu	HTNsive Ne	6-Apr-13	1-Aug-13
172	1	204	Vijayalaksh	546115D	55	0	153	41	17.5	Tamil nadu	Unknown	28-Aug-10	1-Aug-13
173	1	207	Viswanatha	515557C	63	1	164	68	25.3	Tamil Nadu	DN	30-Aug-10	1-Aug-13
174	1	209	Mageshwa	243496F	59	1	166	65	23.6	Tamil Nadu	DN	11-Jul-12	1-Aug-13
18	0	101	Kul Bahadu	402692F	54	1	148	50	22.8	Bhutan	Unknown	7-May-13	7-May-13
19	0	107	Magi	910330D	39	0	155	55	22.9	Tamil Nadu	Unknown	21-Jul-13	21-Jul-13
2	0	2	Anandan J	303669F	64	1	165	74	27.2	Tamil nadu	Unknown	14-Sep-13	14-Sep-13
20	0	114	Manoranjit	633986A	63	0	147	44	20.4	Tamil Nadu	DN	30-May-13	30-May-13
21	0	19	Moremi	679750F	52	1	166	62	22.5	Tanzania	DN	17-Sep-13	17-Sep-13
22	0	20	Muthukum	657643F	44	1	166	64	23.2	Tamil Nadu	DN	5-Sep-13	5-Sep-13
23	0	127	Navaneeth	422649F	45	0	153	38	16.2	Tamil Nadu	Obstructive	12-May-13	12-May-13
24	0	22	Nawal Kish	441514D	64	1	170	57	19.7	Jharkand	Unknown	15-Aug-13	15-Aug-13
25	0	23	Ondaris No	654747F	51	0	153	49	20.9	Meghalaya	Unknown	28-Aug-13	28-Aug-13
26	0	26	Phuntsho D	691631F	44	1	158	57	22.8	Bhutan	Ischemic N	1-Sep-13	1-Sep-13
27	0	136	Prasenjit Sa	465678F	20	1	163	42	15.8	West Beng	Unknwon	11-May-13	11-May-13
28	0	145	Raman K	603585D	40	1	160	46	18	Tamil nadu	AAV	16-May-13	16-May-13
29	0	28	Ranganatha	735294D	37	0	160	57	22.3	Tamil nadu	?CGN	6-Aug-13	6-Aug-13
3	0	3	Annadurai	831479D	60	1	174	65	21.5	Tamil nadu	DN	10-Oct-13	10-Oct-13

30	0	211	Ravindra G	681609f	38	1	165	66	24.2	Andhra	CGN	1-Aug-13	1-Aug-13
31	0	29	Rashida	639834F	46	0	148	65	29.7	Tamil nadu	Unknown	3-Sep-13	3-Sep-13
32	0	30	Ravi.P	638508D	41	1	169	66	23.1	Tamil naad	Unknown	16-Sep-13	16-Sep-13
33	0	31	Rinchen W	647570F	38	0	150	46	20.4	Bhutan	?CGN	1-Jun-13	1-Jun-13
34	0	153	Roseline G	241094D	59	0	143	44	21.5	Tamil Nadu	IgAN	25-Jul-13	25-Jul-13
35	0	155	Sampath A	264373F	58	1	161	62	23.9	Tamil Nadu	DN	28-May-13	28-May-13
36	0	34	Sangeetha.	357565F	31	0	160	43	36.3	Tamil nadu	Unknown	13-Sep-13	13-Sep-13
37	0	37	Sankar	651524D	46	1	168	93	33	Tamil nadu	DN	31-Oct-13	31-Oct-13
38	0	39	Settu K	440438C	45	1	164	77	28.6	Tamil nadu	DN	2-Sep-13	2-Sep-13
39	0	41	Shanmugar	330253B	51	1	161	64	24.7	Tamil Nadu	DN	16-Aug-13	16-Aug-13
4	0	4	Ashish Cho	206513D	39	1	165	50	18.4	Bangladesh	Unknown	14-Aug-13	14-Aug-13
40	0	42	Shantanu p	645661F	22	1	166	56	20.3	West beng	Unknown	10-May-13	10-May-13
41	0	43	Sivasamy S	229992F	42	1	170	66	22.8	Tamil Nadu	FSGS	17-Sep-13	17-Sep-13
42	0	44	Sopitha Ku	333657F	62	0	150	80	35.6	Tamil Nadu	Obst.Urop	11-Sep-13	11-Sep-13
43	0	45	Srinivasan I	359431F	50	1	167	57	20.4	Tamil Nadu	DN	19-Sep-13	19-Sep-13
44	0	187	Subramany	475107C	65	1	163	62	23.3	Tamil Nadu	DN	25-Jun-13	25-Jun-13
45	0	189	Sumaiya	485743F	29	0	163	46	17.3	Tamil Nadu	Unknwon	11-Jun-13	11-Jun-13
46	0	46	Suresh Kun	623729F	26	1	170	60	20.8	West beng	Unknown	28-Jul-13	28-Jul-13
47	0	47	Tagam Dan	624827F	33	1	166	49	17.8	Arunachal	CIN	24-Jul-13	20-Jul-13
48	0	48	Taheera be	798296D	56	0	150	75	33.3	Tamil Nadu	DN	16-Aug-13	16-Aug-13
49	0	49	Thenmozhi	651772F	34	0	163	52	19.6	Tamil nadu	Unknown	25-Aug-13	25-Aug-13
5	0	5	Baktavacha	073564D	59	1	157	51	20.7	Tamil Nadu	Unknown	28-Sep-13	28-Sep-13
50	0	51	Velazhagar	992657D	56	1	169	61	21.4	Tamil Nadu	DN	27-Jul-13	27-Jul-13
51	0	52	Wittam Pul	332565F	22	1	163	61	23	Arunachal I	CGN	26-Oct-13	26-Oct-13
52	0	53	Yer Talo	689855F	40	1	160	50	19.5	Arunachal I	Unknown	8-Oct-13	8-Oct-13
53	1	54	Aaron	285569D	47	1	157	65	26.4	Tamil Nadu	Renal calcu	1-Oct-10	1-Aug-13
54	1	55	Abdul Rahi	714475C	56	1	166	76	27.6	Tamil Nadu	DN	1-Apr-08	1-Aug-13
55	1	57	Andrew Ka	714561B	68	1	160	64	25	TamilNadu	IgAN	28-Dec-11	1-Aug-13
56	1	58	Annal Daisy	012774D	43	0	157	47	19.1	Tamilnadu	CGN	10-Dec-11	1-Aug-13
57	1	59	Annamalai.	117119B	64	1	176	68	22	Tamil nadu	CPN	28-Feb-12	1-Aug-13
58	1	61	Arasu nava	929450D	64	1	160	47	18.4	Tamilnadu	Unknown	19-Apr-11	1-Aug-13
59	1	62	Arumuga n	233869B	70	1	170	67	23.2	Tamilnadu	DN	25-Sep-12	1-Aug-13
6	0	7	Cheddan La	670039F	32	0	152	57	24.7	Bhutan	CIN	17-Sep-13	17-Sep-13

60	1	63	Arumugam	447032C	55	1	162	64	24.4	Tamilnadu	DN	7-Jan-13	1-Aug-13
61	1	65	Ashok Kum	049725C	46	1	156	58	23.8	Jharkhand	CAN	24-Nov-12	1-Aug-13
62	1	66	Badrinath (	786388D	65	1	155	55	22.9	Andhra Par	CPN	5-Apr-13	1-Aug-13
63	1	67	Balakrishna	106596D	63	1	164	74	27.5	TamilNady	DN	27-Dec-09	1-Aug-13
64	1	68	Balasubran	869449A	59	1	168	57	20.2	Tamil Nadu	HTNsive ne	27-Nov-09	1-Aug-13
65	1	69	Balasubran	110419D	66	1	165	75	27.5	Tamil Nadu	DN	30-Aug-12	1-Aug-13
66	1	71	Bhuvanesh	694842C	30	0	151	53	23.2	Karnataka	IgAN	3-Jun-12	1-Aug-13
67	1	73	Bir bahadu	492596F	34	1	176	57	18.4	Bhutan	Unknown	13-Feb-13	1-Aug-13
68	1	74	Bujji	566257D	31	0	150	50	22.2	Andhra Pra	Unknown	1-Oct-09	1-Aug-13
69	1	75	Chandrasel	924171C	54	1	175	68	22.1	Tamil Nadu	DN	17-Feb-09	1-Aug-13
7	0	9	Chinna K	021221D	34	1	160	55	21.5	Tamil nadu	AntiGBM	26-Jul-13	26-Jul-13
70	1	76	Chandraka	302298D	39	1	162	46	17.5	Tamil Nadu	Unknown	8-Aug-08	1-Aug-13
71	1	8	Chennakes	140251F	67	1	161	52	22	Tamil nadu	DN	25-Mar-13	1-Aug-13
72	1	78	Chintanai s	234739F	22	0	155	39	16.2	Tamil nadu	Unknown	8-Sep-12	1-Aug-13
73	1	79	Dilip Kuma	492171C	51	1	167	61	21.9	Bihar	ADPKD	13-Feb-13	1-Aug-13
74	1	80	Fathima Be	118179B	62	0	160	63	24.6	Tamil Nadu	DN	29-Jun-08	1-Aug-13
75	1	81	Ganesh Bal	307917D	42	1	162	54	20.6	Tamil Nadu	Unknown	28-Aug-09	1-Aug-13
76	1	82	Govindasar	820565C	76	1	167	47	16.9	Tamil nadu	Unknown	30-Nov-07	1-Aug-13
77	1	83	Govindasar	300203C	62	1	168	74	26.2	Tamil Nadu	DN	22-Dec-11	1-Aug-13
78	1	84	Hafeezular	584524C	54	1	177	93	29.7	Tamil nadu	Unknown	11-Feb-09	1-Aug-13
79	1	85	Hafeezunis	156051F	58	0	155	44	18.3	Tamil nadu	Unknown	14-Mar-12	1-Aug-13
8	0	10	Dalpat Sing	632549F	56	1	175	50	16.3	Chattisgarh	DN	19-Aug-13	19-Aug-13
80	1	86	Jagadeeswa	824551D	59	1	153	48	20.5	Andhra Pra	FSGS	28-Aug-10	1-Aug-13
81	1	87	James Jeya	906659B	67	1	170	55	19	Tamil Nadu	Unknown	10-Dec-11	1-Aug-13
82	1	88	Janaki rama	287362F	27	1	160	87	34	Tamil Nadu	CGN	5-Sep-12	1-Aug-13
83	1	89	Jayananada	574003C	66	1	171	93	31.8	Andhra Pra	Renal calcu	13-Oct-08	1-Aug-13
84	1	90	JayaPrakas	181507B	24	1	165	41	15.1	Tamil Nadu	Reflux Nep	7-Sep-10	1-Aug-13
85	1	91	Jayaraman	470457F	48	1	167	44	15.8	Tamil Nadu	DN	15-Dec-12	1-Aug-13
86	1	92	Jothi.P	305657D	67	0	156	90	37	Tamil Nadu	Renal calcu	12-Jan-13	1-Aug-13
87	1	93	Kalaiselvi.S	733246B	62	0	148	59	26.9	Tamil Nadu	Unknown	10-Jul-12	1-Aug-13
88	1	95	Kamesh A	092307F	32	1	166	75	27.2	Tamil Nadu	Unknown	23-Dec-11	1-Aug-13
89	1	96	Kannan S	182673F	52	1	162	51	19.4	Andhra pra	Unknown	26-Apr-12	1-Aug-13
9	0	11	Dhandapar	646561F	54	1	166	61	22.1	Tamil nadu	DN	13-Aug-13	13-Aug-13

90	1	97	K. Kasthuri	129966C	66	0	154	48	20.2	Tamil Nadu	DN	13-Feb-13	1-Aug-13
91	1	100	Kugan C	611491C	47	1	171	60	20.5	Tamil Nadu	DN	4-May-09	1-Aug-13
92	1	102	Kumar K	124695F	38	1	162	42	16	Tamil Nadu	Unknown	6-Feb-12	1-Aug-13
93	1	103	Kumar P	556082D	32	1	178	62	19.6	Tamil nadu	IgAN	23-Dec-11	1-Aug-13
94	1	104	Lakhi Taser	616181F	29	1	155	53	22.1	Arunachal I	Unknown	1-Apr-13	1-Aug-13
95	1	105	Lakshmi T	949847C	57	0	148	48	21.9	Tamil Nadu	DN	17-Jul-12	1-Aug-13
96	1	106	Latha S	469144D	51	0	146	44	17.8	Tamil Nadu	Unknwon	5-Jun-09	1-Aug-13
97	1	108	Mallika K	218248D	47	0	150	49	21.8	Tamil Nadu	Cortical Ne	1-Jun-10	1-Aug-13
98	1	110	Mani B	531893D	60	1	168	59	20.9	Tamil nadu	FSGS	18-Aug-12	1-Aug-13
99	1	111	Manima	826425C	54	0	150	52	23.1	Tamil nadu	HTNsive Ne	13-Feb-12	1-Aug-13

DateoTermination	Act.Durat.i	Financialsu	Enroll.in.Tx	Status.12m	Causeodea	Ini.Mod.Dia	Frequency	ResidualUC	Residu	Access1	Acce1created	Access@enro
17-Nov-13	93	0	0	Migrated		HD	2	2	400	JVC1	2-Sep-13	2-Sep-13
29-Jan-14	243	0	0	Migrated		HD	3	1	100	(o) LIJV	1-Sep-13	1-Sep-13
31-Jul-14	365	0	0	Alive o HD		HD	3	2	200	L BC AVF	5-Mar-13	1-Aug-13
31-Jul-14	365	2	1	Alive o HD		HD	3	1	70	L RC AVF	24-Jan-13	1-Aug-13
29-Apr-14	267	0	1	Alive o PD		HD	3	1	50	L RC AVF	6-Nov-12	1-Aug-13
31-Jul-14	365	1	1	Alive o HD		HD	2	1	90	L RC AVF	21-Jun-12	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	2			L IJV	10-Jul-13	1-Aug-13
31-Jul-14	365	0	0	Alive o HD	`	HD	2			L BC AVF	15-Mar-12	1-Aug-13
3-Dec-13	125	0	1	Migrated		HD	2			L BC AVF	29-Aug-12	1-Aug-13
31-Jul-14	365	0	0	Alve o HD		HD	2			L BC AVF	18-Dec-12	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2			L RC AVF	9-Nov-11	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	2	1	80	L RC AVF	17-Feb-10	1-Aug-13
23-Dec-14	106	0	0	Migrated		HD	2	2	300	R IJV	27-Sep-13	27-Sep-13
31-Jul-14	365	0	0	Alive o HD		HD	3			L RC AVF	1-Feb-09	1-Aug-13
6-Feb-14	190	1	0	Migrated		HD	2			L RC AVF	25-Aug-11	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	2			R RC AVF	24-Sep-12	1-Aug-13
31-Jul-14	365	1	1	Alive o HD		HD	2	3	2000	R PERMca	1-Jun-11	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	3	1	90	R BC AVF	12-Sep-12	1-Aug-13
29-Oct-13	90	0	0	Exipred	?Sepsis	HD	2	1	80	L RC AVF	5-Feb-09	1-Aug-13
31-Dec-13	153	2	0	Migrated		HD	3	1	100	L BC AVF	1-Dec-10	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2	1	50	R BC AVF	19-Apr-12	1-Aug-13
31-Oct-13	92	0	1	Expired	?Sepsis	HD	3	1	80	L RC AVF	1-Sep-11	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	3	1	70	L BC AVF	15-Jan-13	1-Aug-13
22-Oct-14	365	1	1	Alive o HD		HD	2	3	700	R IJV	23-Oct-13	23-Oct-13
31-Jul-14	365	0	1	Alive o HD		HD	3			R RC AVF	1-Dec-12	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2	1	40	L RC AVF	7-Dec-11	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	3	2	300	R PERMca	5-Mar-13	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	3			L RC AVF	21-Aug-12	1-Aug-13
24-Jan-14	177	0	0	Expired	?Sepsis	HD	2	1	80	L PERMca	28-Feb-12	1-Aug-13
9-Dec-13	131	0	1	Migrated		HD	2	1	80	L RC AVF	23-Aug-12	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	3	2	300	L BVT	14-Feb-13	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	3			L BC AVF	20-Sep-12	1-Aug-13

31-Jul-14	365	2	1	Alive o HD		HD	3	1	50	L RC AVF	30-Aug-10	1-Aug-13
12-Jul-14	346	0	0	Expired	Pneumo/Se	HD	2			L RC AVF	17-Oct-12	1-Aug-13
18-Oct-14	365	0	1	Alive o HD		HD	3	3	1100	R IJV	19-Oct-13	19-Oct-13
1-May-14	274	0	0	Expired	? ACS	HD	2			L BC AVF	8-Mar-12	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2			L RC AVF	29-Mar-12	1-Aug-13
17-Dec-13	139	2	1	Transplant		HD	2	2	200	L BC AVF	1-Mar-13	1-Aug-13
27-May-14	300	1	1	Migrated		HD	2	1	50	L RC AVF	7-Apr-11	1-Aug-13
31-Jul-14	365	0	1	Alive o HD		HD	3	1	100	R IJV	30-Apr-13	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	2			L RC AVF	12-Mar-10	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	3	1	50	L RC AVF	28-Feb-13	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	3			L PERMca	15-Jul-10	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2	1	80	L BC AVF	20-Jul-11	1-Aug-13
26-Feb-14	210	0	0	Migrated		HD	2			L BC AVF	11-Sep-12	1-Aug-13
1-Sep-13	365	0	0	Alive o HD		HD	2	3	700	R IJV	2-Sep-13	2-Sep-13
24-Jun-14	328	0	0	Expired	Volume o	HD	2	2	300	R PERMca	24-Jun-13	1-Aug-13
8-Apr-14	251	1	0	Migrated		HD	2			L BC AVF	13-Apr-11	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	2	3	1500	L BC AVF	22-Jan-13	1-Aug-13
3-Jul-14	337	1	0	Expired	?ACS	HD	3	1	50	L BC AVF	16-Jun-12	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2	1	50	R BC AVF	14-Jan-13	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	3			L RC AVF	15-Dec-11	1-Aug-13
14-Jul-14	348	0	0	Expired		HD	2			L BC AVF	20-Jul-11	1-Aug-13
30-Jan-14	183	0	0	Expired		HD	2	1	70	L RC AVF	21-May-13	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2			L RC AVF	25-Oct-11	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2			R BC AVF	5-Aug-08	1-Aug-13
1-Feb-14	163	0	1	Migrated		HD	3	3	600	R FVC	23-Aug-13	23-Aug-13
3-May-14	276	1	0	? Migrated		HD	3			L BC AVF	19-Jun-12	1-Aug-13
31-Jul-14	365	2	1	Alive o HD		CAPD	3			L BVT	25-Apr-12	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	2			R RC AVF	17-Apr-13	1-Aug-13
24-Dec-13	146	0	0	Migrated		HD	3	3	600	L BC AVF	30-Jan-13	1-Aug-13
3-Feb-14	187	0	0	Migrated		HD	2			L BC AVF	29-Mar-11	1-Aug-13
26-May-14	299	1	0	Expired	IC bleed	HD	2			L RC AVF	8-Apr-10	1-Aug-13
22-Jun-14	326	1	0	Expired		HD	3	1	50	L RC AVF	13-Jan-10	1-Aug-13
21-Dec-13	143	1	0	Migrated		HD	2	1	50	L RC AVF	8-Feb-12	1-Aug-13

31-Jul-14	365	1	0	Alive o HD		HD	2	3	700	L BC AVF	22-May-13	1-Aug-13
3-Apr-14	246	1	0	Migrated		HD	2	1	80	L RC AVF	13-Apr-12	1-Aug-13
3-Jul-14	365	2	0	Alive o HD		HD	3	2	300	R IJV	4-Jul-13	4-Jul-13
31-Jul-14	365	1	0	Alive o HD		HD	2	1	80	L BC AVF	10-Sep-08	1-Aug-13
24-Jun-14	328	0	0	Expired	Sepsis	HD	3	1	50	L RC AVF	23-Mar-11	1-Aug-13
1-Apr-14	244	0	0	Migrated		HD	2			L RC AVF	3-Apr-12	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2	1	80	L RC AVF	1-Apr-12	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	3			R RC AVF	20-Jun-13	1-Aug-13
29-Oct-13	91	0	1	Transplant		HD	2	2	350	L BC AVF	9-Apr-13	1-Aug-13
2-Apr-14	245	1	0	Migrated		HD	3	3	700	L RC AVF	1-Dec-12	1-Aug-13
30-Oct-13	92	0	1	Transplant		HD	3	2	300	L RC AVF	12-Mar-13	1-Aug-13
29-Jan-14	182	1	0	Migrated		HD	2			L RC AVF	14-Mar-12	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	3	1	50	L RC AVF	28-Feb-13	1-Aug-13
15-May-14	349	2	1	Transplant		HD	3	1	60	R IJV	5-Jun-13	5-Jun-13
2-Nov-13	94	1	0	Expired	?Intestinal	HD	2	1	80	L RC AVF	2-Aug-06	1-Aug-13
31-Jul-14	365	2	0	Alive o HD		HD	2			L RC AVF	19-Apr-13	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2	1	80	R IJV	13-Jun-13	1-Aug-13
31-Jul-14	365	2	0	Alive o HD		HD	3	1	30	R RC AVF	25-May-11	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	2	1	70	L BC AVF	1-Aug-12	1-Aug-13
19-Sep-14	136	2	1	Transplant		HD	3	3	2000	R IJV	7-May-13	7-May-13
21-Jan-14	185	0	0	Expired	Unknown	HD	2	1	100	R IJV	21-Jul-13	21-Jul-13
1-Feb-14	141	0	1	Migrated		HD	2	2	300	JVC1	14-Sep-13	14-Sep-13
29-May-14	365	2	0	Alive o HD		HD	3	2	700	R IJV	30-May-13	30-May-13
15-Dec-13	90	0	0	Migrated		HD	3	3	1000	R IJV	17-Sep-13	17-Sep-13
12-Jul-14	311	1	1	Alive o PD		HD	3	3	600	R IJV	5-Sep-13	5-Sep-13
11-May-14	365	1	0	Alive o HD		HD	2	2	300	R IJV	12-May-13	12-May-13
9-Nov-13	91	0	0	Migrated		HD	3	3	700	R IJV	16-Aug-13	16-Aug-13
16-Jan-14	142	0	1	Alive o PD		HD	3	3	500	PrRRC AV	1-Jul-13	1-Jul-13
12-Dec-13	103	2	0	Migrated		HD	3	2	160	R IJV	4-Oct-14	4-Oct-14
23-Oct-13	166	0	1	Migrated		HD	3	1	90	R IJV	11-May-13	11-May-13
15-May-14	365	0	1	Alive o HD		HD	2	1	50	PrLBC AV	6-Nov-12	6-Nov-12
10-Apr-14	248	1	1	Migrated		HD	3	3	600	R IJV	6-Aug-13	6-Aug-13
4-Apr-14	177	0	0	Migrated		HD	2	3	800	PrLBC AV	28-Feb-13	28-Feb-13

16-Dec-13	140	0	0	Migrated		HD	2	2	250	PrLRC AV	11-Sep-12	11-Sep-13
22-Dec-13	111	0	0	Migrated		HD	3	3	300	R IJV	15-Aug-13	15-Aug-13
15-Sep-14	365	0	1	Alive o HD		HD	3	3	730	R IJV	16-Sep-13	16-Sep-13
13-Feb-14	258	2	1	Transplant		HD	3	3	900	R IJV	21-Aug-13	21-Aug-13
24-Jul-14	365	1	0	Alive o HD		HD	3	1	90	R IJV	25-Jul-13	25-Jul-13
27-May-14	365	1	0	Alive o HD		HD	2	1	50	R IJV	28-May-13	28-May-13
12-Sep-13	365	2	1	Alive o HD		HD	3	3	780	PrLRC AV	1-Aug-13	1-Aug-13
24-Feb-14	117	0	0	Migrated		HD	3	3	500	PrRRC AV	4-Feb-13	4-Feb-13
1-Sep-14	365	0	1	Alive o HD		HD	3	2	300	R IJV	2-Sep-13	2-Sep-13
15-Aug-14	365	0	0	Alive o HD		HD	3	3	1000	R IJV	16-Aug-13	16-Aug-13
23-Nov-13	102	0	1	Transplant		HD	3	3	1000	R IJV	14-Aug-13	14-Aug-13
9-May-14	365	0	1	Alive o HD		HD	3	3	1000	R IJV	10-Aug-13	10-Aug-13
22-Dec-13	97	0	1	Migrated		HD	3	3	1200	R IJV	17-Sep-13	17-Sep-13
9-Jul-14	302	0	0	Alive o PD		HD	3	3	600	R IJV	11-Sep-13	11-Sep-13
10-Jul-14	295	0	0	Migrated		HD	2	3	2400	R IJV	9-Sep-13	9-Sep-13
24-Jun-14	365	1	0	Alive o HD		HD	2	3	1500	R IJV	25-Jun-13	25-Jun-13
9-Jan-14	213	0	0	Alive o PD		HD	3	2	150	FVC	10-Jun-13	10-Jun-13
29-Jan-14	186	0	1	Transplant		HD	2	3	600	R IJV	29-Jul-13	29-Jul-13
17-Oct-13	90	0	1	Transplant		HD	3	3	3000	R IJV	24-Jul-13	24-Jul-13
25-Feb-14	194	1	0	Migrated		HD	2	2	300	R IJV	16-Aug-13	16-Aug-13
10-Jul-14	320	0	1	Transplant		HD	3	3	1000	R IJV	25-Aug-13	25-Aug-13
23-Jan-14	118	0	0	Migrated		HD	2	3	1500	R IJV	28-Sep-13	28-Sep-13
26-Jul-14	365	1	0	Alive o HD		HD	3	3	600	R IJV	27-Jul-13	27-Jul-13
25-Oct-14	365	0	1	Alive o HD		HD	3	1	90	R IJV	1-Oct-13	1-Oct-13
7-Oct-14	365	0	1	Alive o HD		HD	3	2	300	PrLRC AV	1-Oct-13	1-Oct-13
31-Jul-14	365	2	0	Alive o HD		HD	3	1	100	R RC AVF	21-Dec-10	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	2	1	100	L BC AVF	16-Apr-08	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	2		50	L RC AVF	15-Jan-12	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	3			L RC AVF	12-Apr-12	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	3			R BVT	29-Apr-13	1-Aug-13
18-Nov-13	110	0	0	Alive o PD		HD	3			L RC AVF	1-May-11	1-Aug-13
31-Dec-13	153	0	0	Expired	ACS	HD	3	1	80	L BC AVF	3-Oct-12	1-Aug-13
14-May-14	240	2	1	Transplant		HD	3	3	900	R IJV	17-Sep-13	17-Sep-13

31-Jul-14	365	1	0	Alive o HD		HD	2	1	70	L RC AVF	21-Jan-13	1-Aug-13
13-Nov-13	105	2	1	Transplant		HD	3	3	1000	L BC AVF	13-Dec-12	1-Aug-13
6-Nov-13	98	0	0	Alive o PD		HD	3	1	100	L BC AVF	5-Jun-13	1-Aug-13
29-Oct-13	90	1	0	Expired	ACS	HD	2	1	50	L RC AVF	10-Feb-10	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD				L BC AVF	1-Dec-11	1-Aug-13
1-Apr-14	244	0	1	Alive o PD		HD	3	3	600	L BC AVF	20-Sep-12	1-Aug-13
25-Jan-14	178	0	1	Transplant		HD	3	3	500	L RC AVF	29-Aug-12	1-Aug-13
29-Oct-13	91	2	1	Transplant		HD	3			L IJV	27-Jul-13	1-Aug-13
31-Jul-14	365	0	1	Alive o HD		HD	2	1	20	L RC AVF	27-Nov-09	1-Aug-13
18-Dec-13	140	2	1	Alive o PD		HD	3	3	20	L BVT	17-Oct-12	1-Aug-13
25-Jul-14	365	1	0	Alive o HD		HD	3	3	500	R IJV	6-Jul-13	6-Jul-13
31-Jul-14	365	1	1	Alive o HD		HD	3	1	80	L RC AVF	20-Aug-08	1-Aug-13
7-Apr-14	250	0	0	Expired		HD	2	1	80	L RC AVF	1-Mar-13	1-Aug-13
6-Dec-14	128	0	0	Migrated		HD	2	3	500	R IJV	8-Mar-13	1-Aug-13
24-Nov-13	116	0	1	Transplant		HD	2	3	700	PrLRC AV	13-Feb-13	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2	1	40	L BC AVF	16-Jul-08	1-Aug-13
31-Jul-14	365	1	1	Alive o HD		HD	3	1	70	L BC AVF	3-Nov-09	1-Aug-13
31-Jul-14	365	2	0	Alive o HD		HD	2	1	70	R RC AVF	28-Nov-11	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2			L RC AVF	28-Feb-12	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	3	1	50	L BC AVF	29-Feb-12	1-Aug-13
6-Feb-14	190	1	0	Expired	Pneu/Sep	HD	3	3	1000	L BVT	30-Jan-13	1-Aug-13
23-Apr-14	248	0	1	Transplant		HD	3	3	2000	PrLRC AV	10-Jun-13	10-Jun-13
31-Jul-14	365	1	0	Alive o HD		HD	3	1	70	R RC AVF	8-Aug-10	1-Aug-13
31-Jul-14	365	2	0	Alive o HD		HD	3	1	70	R RC AVF	10-May-12	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	3	3	500	L RC AVF	10-Oct-12	1-Aug-13
31-Jul-14	365	2	0	Alive o HD		HD	2	1	70	PrLBC AV	26-Mar-07	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2	1	70	L BC AVF	1-Mar-12	1-Aug-13
30-Oct-13	91	2	0	Migrated		HD	3	1	80	R BC AVF	1-Feb-13	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	2	3	1500	L RC AVF	13-Feb-13	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2	1	40	L BC AVF	1-Nov-12	1-Aug-13
30-Oct-13	92	0	1	Transplant		HD	2	1	60	L RC AVF	20-Feb-12	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	2	1	80	L RC AVF	23-May-12	1-Aug-13
21-Nov-13	101	0	0	Migrated		HD	3	3	1000	R IJV	13-Aug-13	13-Aug-13

31-Jul-14	365	1	0	Alive o HD		HD	3	1	80	L PERMca	4-May-13	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	3			L RC AVF	21-Apr-09	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	3	1	20	L RC AVF	13-Feb-13	1-Aug-13
7-May-14	280	1	0	Migrated		HD	2			L RC AVF	2-Jan-11	1-Aug-13
8-May-14	281	0	1	Transplant		HD	3	3	1000	L BC AVF	18-Jun-13	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2	1	50	R RC AVF	14-Jun-12	1-Aug-13
14-Jun-14	318	1	1	Alive o HD		HD	3	1	50	L BC AVF	9-Jul-09	1-Aug-13
31-Jul-14	365	0	1	Alive o HD		HD	2	1	50	L BC AVF	10-Feb-11	1-Aug-13
31-Jul-14	365	0	0	Alive o HD		HD	2			L BC AVF	11-Sep-12	1-Aug-13
31-Jul-14	365	1	0	Alive o HD		HD	2	3	1000	L RC AVF	26-Apr-12	1-Aug-13

DATEofTERM	Access2	Access3	Access4	Access5	Access6	Primary.Fa	Secondary.	No.of.New	Act.days.or	Days.onJVC	Days.onJVC	Days.onJVC	Days.onCV
17-Nov-13	JVC2	BVT						1	25	59	16		
29-Jan-14	R IJV							0	0	21	127		
31-Jul-14									365	0			
31-Jul-14									365	0			
29-Apr-14									267	0			
31-Jul-14	R IJV	L BVT					1		281	111			
31-Jul-14	R IJV	R IJV	R BVT						51	56	212	97	
31-Jul-14									365	0			
3-Dec-13									125	0			
31-Jul-14									365	0			
31-Jul-14									365	0			
31-Jul-14									365	0			
23-Dec-14	L BC AVF							1	60	81			
31-Jul-14									365	0			
6-Feb-14				`					190	0			
31-Jul-14	R IJV								365	23			
31-Jul-14									0	0			
31-Jul-14									365	0			
29-Oct-13									90	0			
31-Dec-13									153	0			
31-Jul-14									365	0			
31-Oct-13									92	0			
31-Jul-14	R IJV	R BC AVF					1		341	46			
22-Oct-14	L RC AVF							1	335	108			
31-Jul-14									365	0			
31-Jul-14									365	0			
31-Jul-14									0	0			
31-Jul-14									365	0			
24-Jan-14									0	0			
9-Dec-13									131	0			
31-Jul-14									365	0			
31-Jul-14									365	0			

31-Jul-14									365	0			
12-Jul-14	R IJV	L BC AVF					1		252	30			
18-Oct-14	L IJV	L BC AVF						1	327	12	63		
1-May-14									274	0			
31-Jul-14									365	0			
17-Dec-13									139	0			
27-May-14									300	0			
31-Jul-14	L BC AVF								339	62			
31-Jul-14									365	0			
31-Jul-14									365	0			
31-Jul-14									0	0			
31-Jul-14									365	0			
26-Feb-14									210	0			
1-Sep-14	L IJV	L RC AVF						1	88	211	91		
24-Jun-14									0	0			
8-Apr-14									251	0			
31-Jul-14									365	0			
3-Jul-14									337	0			
31-Jul-14	L PERMcat						1		232	0			
31-Jul-14									365	0			
14-Jul-14									348	0			
30-Jan-14	R IJV						1		183	37			
31-Jul-14									365	0			
31-Jul-14									365	0			
1-Feb-14	R IJV	L RC AVF						1	136	4	54		
3-May-14									276	0			
31-Jul-14									365	0			
31-Jul-14									365	0			
24-Dec-13									146	0			
3-Feb-14									187	0			
26-May-14									299	0			
22-Jun-14									326	0			
21-Dec-13									143	0			

31-Jul-14	R IJV	L BVT	L BA AVG			2	1		152	206			
3-Apr-14									246	0			
3-Jul-14	L BC AVF	R IJV	R RC AVF				1	2	300	93	72		
31-Jul-14									365	0			
24-Jun-14									328	0			
1-Apr-14									244	0			
31-Jul-14									365	0			
31-Jul-14									365	0			
29-Oct-13									91	0			
2-Apr-14									245	0			
30-Oct-13									92	0			
29-Jan-14									182	0			
31-Jul-14									365	0			
15-May-14	L BC AVF							1	284	56			
2-Nov-13									94	0			
31-Jul-14									365	0			
31-Jul-14									0	365			
31-Jul-14									365	0			
31-Jul-14									365	0			
19-Sep-14	R IJV							0	0	129	3		
21-Jan-14	L IJV							0	0	141	44		
1-Feb-14	L RC AVF1	L BC AVF2				1		2	122	83			
29-May-14	L BC AVF	R IJV	R BC AVF				1	2	337	20	81		
15-Dec-13								0	0	90			
12-Jul-14	L BC AVF	L IJV	R RC AVF	L IJV	R FVC	1	1	2	160	126	115	57	9
11-May-14	R IJV	L BC AVF						1	18	11	354		
9-Nov-13	L RC AVF							1	45	68			
16-Jan-14	L IJV						1	0	142	11			
12-Dec-13	R BC AVF							1	57	37			
23-Oct-13	L RC AVF							1	140	62			
15-May-14								0	365	0			
10-Apr-14	L RC AVF							1	271	85			
4-Apr-14								0	177	0			

16-Dec-13								0	140	0			
22-Dec-13	L RC AVF							1	112	59			
15-Sep-14	L BC AVF							1	357	62			
13-Feb-14	L BC AVF	R IJV						1	157	39	5		
24-Jul-14	L BC AVF							1	346	73			
27-May-14	L BC AVF							1	357	38			
12-Sep-13	R IJV	L BC AVF					1	0	360	28			
24-Feb-14								0	117	0			
1-Sep-14	L RC AVF	R BC AVF				1		2	327	79			
15-Aug-14	L IJV	L RC AVF						1	223	107	64		
23-Nov-13	L RC AVF							1	81	62			
9-May-14	L RC AVF							1	246	64			
22-Dec-13	L RC AVF							1	80	58			
9-Jul-14	L BC AVF	L IJV	R FVC			1		1	246	138	25	9	
10-Jul-14	L RC AVF							1	125	203			
24-Jun-14	L RC AVF							1	342	130			
9-Jan-14	R IJV	L IJV	L BC AVF					1	81	12	13	184	
29-Jan-14	L RC AVF	L IJV						1	5	81	100		
17-Oct-13	L RC AVF							1	50	61			
25-Feb-14	L BC AVF	L IJV						1	170	41	37		
10-Jul-14	L BC AVF							1	301	60			
23-Jan-14	L RC AVF	L BC AVF	L BVT			1	1	3	86	97			
26-Jul-14	L BC AVF							1	324	85			
25-Oct-14	L RC AVF							1	286	79			
7-Oct-14								0	365	0			
31-Jul-14									365	0			
31-Jul-14									365	0			
31-Jul-14									365	0			
31-Jul-14									365	0			
31-Jul-14									365	0			
29-Nov-13	R IJV								93	28			
31-Dec-13									153	0			
14-May-14	R PERM ca							0	0	139			

31-Jul-14									365	0			
13-Nov-13									105	0			
6-Nov-13									98	0			
29-Oct-13									90	0			
31-Jul-14	L IJV								283	65			
1-Apr-14	R BC AVF	R FVC	L FVC				2		206	25	11		
25-Jan-14									178	0			
29-Oct-13	L RC AVF								82	45			
31-Jul-14									365	0			
18-Dec-13	L IJV	L IJV					1		117	19	4		
25-Jul-14	L BC AVF							1	320	95			
31-Jul-14									365	0			
7-Apr-14									250	0			
6-Dec-14	L BVT								2	128			
24-Nov-13									116	0			
31-Jul-14									365	0			
31-Jul-14	L IJV	R PERMcat					1		50	4			
31-Jul-14	L IJV	L BC AVF					1		359	7			
31-Jul-14									365	0			
31-Jul-14									365	0			
6-Feb-14									190	0			
23-Apr-14								0	248	0			
31-Jul-14									365	0			
31-Jul-14									365	0			
31-Jul-14									365	0			
31-Jul-14									365	0			
31-Jul-14									365	0			
30-Oct-13									91	0			
31-Jul-14									365	0			
31-Jul-14									365	0			
30-Oct-13									92	0			
31-Jul-14									365	0			
21-Nov-13	L IJV	L RC AVF						1	98	13	50		

31-Jul-14								0	0			
31-Jul-14								365	0			
31-Jul-14								365	0			
7-May-14								280	0			
8-May-14								281	0			
31-Jul-14								365	0			
14-Jun-14								318	0			
31-Jul-14								365	0			
31-Jul-14								365	0			
31-Jul-14								365	0			

Act.days.or	Access@las	Curr.Acc.Cre	AVF.Dysfn	Post.Dfn.D	Interv.Aft.D	Post.Dfn.Fi	Interv.Aft.F	Hist_of_DM	Hist_of_HT	Hst.of.IHD	Hist.of.CVD	Hist.of.COP	Hist.of.Tb
59	L IJV	1-Nov-13	N	N		N		0	1	0	0	0	0
148	R IJV	22-Sep-13	0	0		0		0	1	0	0	0	1
0	L BC AVF	5-Mar-13	n	n		n		1	1	0	0	0	0
0	L RC AVF	24-Jan-13	n	n		n		0	1	0	0	0	0
0	L RC AVF	6-Nov-12	n	n		n		0	1	0	0	0	1
111	L BVT	19-Mar-14	Y	Y	new AVF	n		1	1	0	0	0	0
365	R BVT	8-Jun-14	y	y	BVT	n		1	1	0	0	0	0
0	L BC AVF	15-Mar-12	n	n		n		0	1	0	0	0	0
0	L BC AVF	29-Aug-12	n	n		n		1	1	0	0	0	0
0	L BC AVF	18-Dec-12	N	n		n		1	1	0	0	0	0
0	L RC AVF	9-Nov-11	n	n		n		0	1	0	0	0	0
0	L RC AVF	17-Feb-10	n	n		n		0	1	0	0	0	0
81	L BC AVF	23-Oct-13	N	N		N		1	1	0	0	0	0
0	L RC AVF	1-Feb-09	n	n		n		0	1	0	0	0	0
0	L RC AVF	25-Aug-11	n	n		n		0	1	0	0	0	0
23	R RC AVF	24-Sep-12	Y	Y	2 failur	n		0	1	0	0	0	0
0	R PERMcat	1-Jun-11	0	0		0		0	1	0	0	0	0
0	R BC AVF	12-Sep-12	Y	Y	No Throm	Y	CVS-Angi	1	1	0	0	0	0
0	L RC AVF	5-Feb-09	N	n		n		1	1	0	0	0	0
0	L BC AVF	1-Dec-10	N	N		N		1	1	0	0	0	0
0	R BC AVF	19-Apr-12	n	n		n		0	1	0	0	0	0
0	L RC AVF	1-Sep-11	n	n		n		1	1	0	0	0	1
46	R IJV	15-Jun-14	Y	Y	2 failur	n		1	1	0	0	0	0
108	L RC AVF	23-Oct-13	Y	Y		N		0	1	0	0	0	0
0	R RC AVF	1-Dec-12	n	n		n		0	1	0	0	0	0
0	L RC AVF	7-Dec-11	n	n		n		1	1	0	0	0	0
0	R PERMcat	5-Mar-13	0	0		0		1	1	1	0	0	0
0	L RC AVF	21-Aug-12	Y	Y	No Throm	0		0	1	0	0	0	0
0	L PERMcat	28-Feb-12	0	0		0		0	1	0	0	0	1
0	L RC AVF	23-Aug-12	n	n		n		0	1	0	0	0	0
0	L BVT	14-Feb-13	n	n		n		1	1	0	0	0	0
0	L BC AVF	20-Sep-12	n	n		n		1	1	0	0	0	0

0	L RC AVF	30-Aug-10	n	n		n		0	1	0	0	0	0
30	L BC AVF	2-Oct-13	y	y		n		1	1	0	0	0	0
75	L BC AVF	21-Nov-13	Y	Y		N		0	0	0	0	1	0
0	L BC AVF	8-Mar-12	n	n		n		0	1	0	0	0	0
0	L RC AVF	1-Mar-13	n	n		n		0	1	0	0	0	0
0	L BC AVF	1-Mar-13	0	0		0		0	0	1	0	0	0
0	L RC AVF	7-Apr-11	n	n		n		0	1	0	0	0	0
62	L BC AVF	27-Aug-13	n	n		n		0	1	0	0	0	0
0	L RC AVF	12-Mar-10	n	n		n		1	1	1	1	0	1
0	L RC AVF	28-Feb-13	n	n		n		1	1	0	0	0	0
0	L PERMcatl	15-Jul-13	0	0		0		0	1	0	0	0	0
0	L BC AVF	20-Jul-11	n	n		n		1	1	0	0	0	0
0	L BC AVF	11-Sep-12	n	n		n		1	1	0	0	0	0
302	L RC AVF	4-Jun-14	N	N		n		1	1	0	0	0	0
0	R PERMcat	21-Jun-13	0	0		0		0	1	0	0	0	0
0	L BCAVF	13-Apr-11	n	n		n		1	1	0	0	0	0
0	L BC AVF	22-Jan-13	n	n		n		1	1	0	0	0	0
0	L BC AVF	16-Jun-12	n	n		n		1	1	1	0	0	0
0	L IJ PERMc	22-Mar-14	y	t	Thro RBC	n		1	1	1	0	0	0
0	L RC AVF	15-Dec-11	Y	Y	No throm	Y	CVS- Ang	1	1	1	0	0	0
0	L BC AVF	20-Jul-11	n	n		n		1	1	1	0	0	0
37	R IJV	8-Sep-13	Y	Y	LRC AVFh	Y	Conserva	1	1	1	0	0	0
0	L RC AVF	25-Oct-11	n	n		n		1	1	0	0	0	0
0	R BC AVF	5-Aug-08	n	n		n		1	1	0	0	0	0
58	L RC AVF	17-Sep-13	N	N		N		0	1	0	0	0	0
0	L BC AVF	19-Jun-12	n	n		n		0	1	0	0	0	0
0	L BVT	25-Apr-12	n	n		n		0	1	0	0	0	0
0	R RC AVF	17-Apr-13	Y	Y	No throm	Y	AngiopRC	1	1	0	0	0	0
0	L BC AVF	30-Jan-13	Y	Y		Y		1	1	1	0	0	0
0	L BC AVF	29-Mar-11	n	n		n		1	1	0	0	0	0
0	L RC AVF	8-Apr-10	n	n		n		1	1	0	0	0	0
0	L RC AVF	13-Jan-10	n	n		n		1	1	0	0	0	0
0	L RC AVF	8-Feb-12	n	n		n		1	1	0	0	0	0

206	L BA AVG	8-Jun-14	y	y	bcAVFthr	n		1	1	0	0	0	0
0	L RC AVF	13-Apr-12	n	n		n		1	1	0	0	0	0
165	R RC AVF	4-Mar-14	Y	Y	Rexplore	Y	New AVF	0	1	0	0	0	0
0	L BC AVF	10-Sep-08	n	n		n		1	1	0	0	0	0
0	L RC AVF	23-Mar-11	n	n		n		1	1	0	0	0	0
0	L RC AVF	3-Apr-12	n	n		n		0	1	0	0	0	0
0	L RC AVF	1-Apr-12	n	n		n		0	1	0	0	0	0
0	R RC AVF	20-Jun-13	Y	Y	Stenosis	Y	CVS Angi	0	1	0	0	0	0
0	L BC AVF	9-Apr-13	N	N		n		0	1	0	0	0	1
0	L RC AVF	1-Dec-12	n	n		n		0	1	0	0	0	0
0	L RC AVF	12-Mar-13	n	n		n		1	1	0	0	0	0
0	L RC AVF	14-Mar-12	n	n		n		1	1	0	0	0	0
0	L RC AVF	28-Feb-13	n	n		n		0	1	0	0	0	0
56	L BC AVF	1-Aug-13	n	n		n		0	0	0	0	0	0
0	L RC AVF	2-Aug-06	n	n		n		0	1	0	0	0	0
0	L RC AVF	19-Jun-13	Y	Y	PERM CAt	y	L BC AVF	0	1	1	0	1	0
365	R IJV	13-Jun-13	n	n		n		0	1	0	0	0	0
0	R RC AVf	25-May-11	n	n		n		1	1	0	0	0	0
0	L BC AVf	1-Aug-12	n	n		n		1	1	0	0	0	1
132	R IJV	16-Sep-13	0	0		0		1	1	0	0	0	0
185	L IJV	7-Dec-13	0	0		0		0	1	0	0	0	0
83	L BC AVF	14-Oct-13	Y	Y	1 Failur	n		0	1	0	0	0	0
101	R BC AVF	28-Jan-14	Y	Y	Warf	Y	Conserva	1	1	0	0	0	1
90	R IJV	17-Sep-13	0	0		0		1	1	0	0	0	0
307	R FVC	7-Jul-14	Y	Y		n		1	1	0	0	0	1
365	L IJV	17-Jun-14	Y	Y	1 failur	n		0	1	1	0	0	0
68	L RC AVF	24-Nov-13	n	n		n		1	1	0	0	0	0
11	R RC AVF	1-Jul-13	Y	Y		Y		0	1	0	0	0	0
37	R BC AVF	15-Oct-13	n	n		n		0	1	0	0	0	0
62	L RC AVF	3-Jun-13	n	n		n		0	1	0	0	0	0
0	PrRBC AVF	6-Nov-12	n	n		n		0	1	0	0	0	1
85	L RC AVF	11-Sep-13	n	n		n		0	1	0	0	0	0
0	PrLBC AV	28-Feb-13	N	N		n		1	0	1	0	0	0

0	PrLRC AV	1-Apr-13	n	n		n		0	1	0	0	0	0
59	L RC AVF	1-Sep-13	n	n		n		0	1	0	0	0	0
62	L BC AVF	24-Sep-13	n	n		n		0	1	0	0	0	0
44	L BC AVF	4-Sep-13	n	n		n		0	0	0	0	0	1
73	L BC AVf	14-Aug-13	n	n		n		1	1	0	0	0	0
38	L BC AVF	5-Jun-13	Y	Y	Conserva	Y	Conserva	1	1	0	0	0	0
28	L BC AVF	11-Mar-13	y	y		y		0	1	0	0	0	0
0	PrRRC AV	4-Feb-13	n	n		n		1	1	0	0	0	0
79	R BC AVF	9-Oct-13	Y	Y	R BC AVF	N		1	1	0	0	0	0
171	L RC AVF	2-Jan-14	n	n		n		1	1	1	0	0	0
62	L RC AVF	2-Sep-13	N	N		N		0	1	0	0	0	0
64	L RC AVF	3-Sep-13	n	n		n		0	1	0	0	0	0
58	L RC AVF	2-Oct-13	Y	Y		N		0	1	0	0	0	0
172	R FVC	1-Jul-14	Y	Y		Y		0	0	0	0	0	0
203	L RC AVf	5-Mar-14	n	n		n		1	1	0	0	0	0
130	L RC AVF	17-Jul-13	n	n		n		1	1	0	0	0	0
209	L IJV	5-Jul-13	y	y		Y	Angiopla	0	1	0	0	0	0
181	L IJV	19-Oct-13	Y	Y		N		0	1	0	0	0	1
61	L RC AVF	27-Aug-13	n	n		n		0	1	0	0	0	0
78	L BC AVF	5-Sep-13	n	n		n		1	1	0	0	0	0
60	L BC AVF	10-Sep-13	n	n		n		0	1	0	0	0	0
97	L BVT	3-Dec-13	Y	Y		n		0	1	0	0	0	0
85	L BC AVF	9-Sep-13	N	n		n		1	1	1	0	0	0
79	L RC AVF	19-Dec-13	n	n		n		0	1	0	0	0	0
0	PrLRC AV	1-Oct-13	n	n		n		0	0	0	0	0	0
0	R RC AVF	21-Dec-10	n	n		n		1	1	0	0	0	0
0	L BC AVF	16-Apr-08	n	n		n		1	1	0	0	0	1
0	L RC AVF	15-Jan-12	N	n		n		1	1	0	0	0	0
0	L RC AVF	12-Apr-12	n	n		n		0	1	0	0	0	0
0	R BVT	29-Apr-13	N	n		n		1	1	1	0	0	0
28	R IJV	1-Nov-13	Y	Y	conserva	Y	Conserva	1	1	0	0	0	0
0	L BC AVF	1-Nov-13	N	n		n		1	1	0	0	0	0
139	R PERM cat	6-Feb-14	0	0		0		0	0	0	0	0	0

0	L RC AVF	21-Jan-13	n	n		n		1	1	0	0	0	0
0	L BC AVF	13-Dec-12	N	N		N		0	1	0	0	0	0
0	L BC AVF	5-Jun-13	n	n		n		1	1	0	0	0	0
0	L RC AVF	10-Feb-10	n	n		n		1	1	0	0	0	0
65	L BC AVF	1-Dec-11	Y	Y	Reexplor	Y	Conserva	0	1	0	0	0	0
36	L FVC	21-Mar-14	Y	Y	New fis	Y	New fist	1	1	0	0	0	0
0	L RC AVF	29-Aug-12	y	y	Conserva	Y	conserva	0	1	0	0	0	0
45	L RC AVF	7-Aug-14	Y	Y	Rexplore	N		0	1	0	0	0	1
0	L RC AVF	27-Nov-19	Y	n		n		0	1	0	0	0	0
23	L IJV	14-Dec-13	Y	Y	Angi+THR	Y	Angiopla	1	1	0	0	0	0
95	L BC AVF	22-Aug-13	N	N		N		0	0	0	0	0	0
0	L RC AVF	20-Aug-08	n	n		n		0	1	0	0	0	0
0	L RC AVF	1-Mar-13	N	N		n		1	1	0	0	0	0
128	R IJV	8-Mar-13	n	n		n		0	1	0	0	0	0
0	PrLRC AV	23-Oct-13	n	n		n		0	1	0	0	0	0
0	L BC AVF	16-Jul-08	n	n		n		1	1	0	0	0	0
4	R PERMcat	24-Sep-13	Y	Y	PERM cat	N		0	1	0	0	0	0
7	L IJV	24-Jul-14	Y	y	New AVF	Y	Not plas	0	1	0	0	0	0
0	L RC AVF	28-Feb-12	n	n		n		1	1	0	0	0	0
0	L BC AVF	29-Feb-12	n	n		n		0	0	0	0	0	0
0	L BVT	30-Jan-13	n	n		n		0	1	0	0	0	0
0	PrLRC AV	10-Jun-13	Y	y		y		1	0	1	0	0	0
0	R RC AVF	8-Aug-10	n	n		n		0	1	0	0	0	0
0	R RC AVF	10-May-12	n	n		n		0	1	0	0	0	0
0	L RC AVF	10-Oct-12	n	n		n		0	1	0	0	0	0
0	PrLBC AV	26-Mar-07	n	n		n		0	1	0	0	0	0
0	L BC AVF	1-Mar-12	n	n		n		0	0	0	0	0	0
0	R BC AVF	1-Feb-13	n	n		n		1	1	0	0	0	1
0	L RC AVF	13-Feb-13	n	n		n		1	1	0	0	0	0
0	L BC AVF	1-Nov-12	n	n		n		0	1	0	0	0	0
0	L RC AVF	20-Feb-12	n	n		n		0	1	0	0	0	0
0	L RC AVF	23-May-12	n	n		n		0	1	0	0	0	0
63	L RC AVF	26-Aug-13	N	N		N		1	1	0	0	0	0

0	L PERMcat	4-May-13	n	n		n		1	1	0	0	1	0
0	L RC AVF	21-Apr-09	n	n		n		1	1	0	0	0	0
0	L RC AVF	13-Feb-13	y	n		y	Conserva	0	1	0	0	0	0
0	L RC AVF	2-Jan-11	n	n		n		0	1	0	0	0	0
0	L BC AVF	18-Jun-13	n	n		n		0	1	0	0	0	0
0	R RC AVF	14-Jun-12	n	n		n		1	0	0	0	0	0
0	L BC AVF	9-Jul-09	n	n		n		0	1	0	0	0	0
0	L BC AVF	10-Feb-11	n	n		n		0	1	0	0	0	0
0	L BC AVF	11-Sep-12	n	n		n		0	1	0	0	0	0
0	L RC AVF	26-Apr-12	Y	Y	Warf	Y	Angiopla	1	0	0	0	0	0

Hist.of.HBV	Hist.of.HCV	Hist_of_Pr	OnAntiCao	Hist.of.oth	PreHD.SBP	PreHD.DBP	Bloodflow	DynamicVP	TMP	EPOtype	EPO.dose	EPO.Cumu.	Durat.of.R
0	0	0	0	n	160	80	200	80	100	Vintor	4000	10	3
0	0	0	0	n	160	80	275	190	140	Vintor	4000	44	4
0	0	0	0	n	160	90	220	170	170	Cre/Vint	40/4K/2K	83.05	12
0	0	0	0	n	130	80	200	120	180	Vi/Mir/E	50/4000	50.07	12
0	0	0	0	n	160	90	250	100	160	Eprex	4000/2000	151	9
0	0	0	0	n	150	90	200	100	110	Vint	2000	22	12
0	0	1	1	n	150	90	200	60	120	Vintor	4000/2000	106	12
0	0	0	0	n	150	80	200	110	200	Vi/Cre/E	40/4k/2k	103.08	12
0	0	0	0	n	170	90	175	90	120	Vintor	2000	11	4
0	0	0	0	n	140	80	200	150	180	Vintor	2000/4000	56	12
0	0	0	0	n	150	90	250	110	140	Vintor	2000	4	12
0	0	0	0	n	140	80	250	90	110	Vintor	4000/2000	77	12
0	0	0	0	n	140	80	200	140	140	Vintor	4000	46	4
0	1	0	1	n	150	90	250	120	140	Vintor	2000/4000	36	12
0	0	0	0	n	160	90	250	100	160	Vintor	2000/4000	58	7
0	0	0	0	n	160	80	230	90	180	Vintor	2000/4000	104	12
0	0	0	0	n	170	80	200	110	250	EPO	4000	50	12
0	0	0	0	Post BKA	140	80	200	140	200	Vin/Cres	4000/40	4.1	12
0	0	0	0	n	140	80	250	160	180	Vintorr	4000/2000	26	3
0	0	0	0	n	160	90	250	100	160	Zyrop	4000	46	3
0	0	0	1	n	150	70	250	120	280	Vintor	4000/2000	99	12
0	1	0	0	n	130	80	220	110	110	Zyrop	4000	42	3
0	0	0	1	n	140	90	200	180	64	Zyr/Vin	4000/2000	166	12
0	0	0	0	n	164	90	200	84	118	Vin/Zy	4000/2000	65	10
0	0	0	0	Post TX	160	90	250	110	120	Zyrop	2000/4000	71	12
0	0	0	0	n	160	90	250	120	250	Vintor	4000/2000	146	12
0	0	1	0	n	150	80	250	140	140	Vintor	2000/4000	74	12
0	0	0	0	HIV	150	90	250	120	140	Vintor	4000/2000	168	12
1	0	1	1	n	160	80	800	130	100	Vintor	2000	46	6
0	0	0	0	n	150	90	250	100	160	Zyp/Vin	4000/2000	57	5
0	0	0	0	n	150	90	250	120	150	Vintor	4000/2000	189	12
1	0	0	0	n	150	70	250	120	160	Vintor	4000/2000	106	12

0	1	0	0	H/o rena	120	70	300	120	200	Zyrop	2000/4000	114	12
0	0	0	0	n	180	90	200	80	150	Vintor	2000	33	12
0	0	0	0	N	130	80	250	105	165	Vintor	2000	72	10
0	0	0	0	n	160	80	200	80	100	Vintor	2000/4000	76	9
0	0	0	0	n	180	90	300	80	180	Vintor	4000/2000	73	12
0	0	0	0	n	160	80	275	190	140	Vintor	4000/2000	40	5
0	0	0	0	n	160	100	250	110	140	Vintor	2000	37	10
0	0	0	0	n	134	80	300	96	160	Zyr/Vin	4000/2000	130	12
0	0	0	0	n	160	90	250	130	140	Eprex	4000/2000	149	12
0	0	0	0	n	140	80	200	90	120	Vintor	4000/2000	44	12
0	0	0	0	n	130	80	200	110	120	Vintor	2000/4000	54	12
0	0	0	0	n	140	80	250	80	120	NO EPO			12
0	0	0	0	n	150	80	200	100	100	Vintor	2000	34	7
0	0	0	0	n	165	92	175	100	300	Vintor	4000	19	11
0	0	0	0	n	160	80	200	100		Vintor	2000/4000	35	11
0	0	0	0	n	150	80	250	160	180	Vintor	2000	50	9
0	0	0	0	n	180	90	250	160	200	Vintor	4000/2000	126	12
0	0	0	0	n	160	80	275	190	140	NO EPO			12
0	0	0	1	n	110	60	225	70	100	Vintor	2000	67	12
0	0	1	1	n	170	90	250	140	120	Zy/Cres	4k/2k/40	59.23	12
0	0	0	0	n	160	80	250	100	160	Vintor	2000	21	12
0	0	0	0	n	150	90	175	100	120	Vintor	2000	48	6
0	0	0	0	Filarias	150	70	250	120	160	Zyr	2000/4000	84	12
0	1	0	0	n	140	80	300	148	42	Vint	4000/2000	74	12
0	0	0	0	n	160	90	250	130	140	Zyr/Vint	4000/2000	42	6
0	0	0	1	n	120	70	250	180	180	Vintor	4000/2000	120	10
0	0	0	1	n	140	80	230	140	110	Zyr/Vin	4000/2000	154	12
0	0	0	0	n	160	80	200	100		Vintor	4000/2000	100	12
0	0	0	0	n	160	90	250	100	160	Zyr/Epr	4000	52	4
0	0	0	0	n	150	70	250	120	160	Vintor	2000	54	7
0	0	0	0	n	140	80	250	80	120	Vintor	2000	31	10
0	0	0	0	n	180	90	250	160	200	Zyr/Vint	4000/2000	134	11
0	0	0	0	n	170	110	250	80	100	Vintor	2000	16	4

0	0	1	1	n	160	80	200	100	120	Zyrop	2000/4000	87	12
0	0	0	0	n	110	70	200	100	140	Vintor	2000	80	9
0	0	0	0	n	160	90	280	85	130	Vintor	2000	66	12
0	0	0	0	n	130	90	200	90	110	Vintor	2000	92	12
0	0	0	0	CIDP	180	90	250	160	200	Vintor	2000/4000	68	11
0	0	0	0	n	150	80	200	100	180	Vintor	2000	27	8
0	0	0	0	n	140	80	250	60	160	Zyrp/Vin	4000/2000	45	12
0	0	0	0	n	160	90	250	100	120	Vintor	4000/2000	202	12
0	0	0	0	n	170	96	250	160	240	Vintor	4000	18	3
0	1	0	0	n	160	90	250	100	160	Vintor	4000/2000	25	8
1	0	0	0	n	160	90	250	100	160	Zyr	4000	18	3
0	0	0	0	n	150	100	250	100	140	Vintor	4000/2000	63	6
0	0	0	0	n	140	80	200	90	110	Vintor	4000/2000	86	12
0	0	0	0	n	140	80	200	90	140	Eprex	2000/4000	99	10
0	0	0	0	n	130	80	250	90	110	No EPO			3
0	0	1	1	n	140	80	200	100	120	Vintor	4000/2000	54	12
0	0	0	0	n	150	90	220	130	140	Vintor	2000	1	12
0	0	0	0	n	140	80	250	80	120	Vin/Cres	4k/2k/40	36.3	12
0	0	0	0	n	150	80	220	130	140	Vin/Zyr	2000/4000	51	12
0	0	0	0	n	170	96	250	160	240	Epr/Vint	4000/2000	94	5
0	0	0	0	n	180	90	200	80	100	Vintor	4000	28	6
0	0	0	0	n	160	80	220	80	110	Vintor	4000	34	5
0	0	0	0	n	150	90	250	100	100	Vi/Zy/Ep	4000/2000	145	12
1	0	0	0	n	180	90	200	80	150	Eprex	4000	68	4
0	0	1	0	n	140	90	200	100		Vintor	4000/2000	185	11
0	0	0	0	Ca bladd	180	90	200	90	100	Vin/Cres	2k/4K/40	72.01	12
0	0	0	0	n	135	80	250	100	124	Eprex/Zy	4000	42	3
0	0	1	1	n	160	80	200	100		Eprex	4000	92	6
0	0	0	0	n	140	80	200	140	125	Eprex	4000	30	3
0	0	0	0	n	160	90	250	130	140	Vintor	4000	90	5
0	0	0	0	n	150	90	250	110	250	Vintor	4000/2000	81	12
0	0	0	0	n						Vintor	4000	56	9
0	0	0	0	n	170	90	250	80	150	Vintor	2000/4000	56	6

1	0	0	0	n	160	70	250	80	120	Vintor	4000	12	4
0	0	0	0	n	130	90	250	110	80	Vintor	2000/4000	49	4
0	0	0	0	n	180	90	200	80	130	Vintor	4000/2000	80	11
0	0	0	0	n	140	80	200	140	140	Vint/Epx	2000/4000	74	7
0	0	0	0	n	160	90	250	100	120	Zyr/Vint	4000	199	12
0	0	0	0	n	170	80	200	160	80	Vin/Zyr	4000/2000	54	12
0	0	0	0	n	130	80	250	142	150	Vintor	4000/2000	150	11
0	0	0	0	n	160	90	250	100	160	Vintor	4000/2000	52	5
0	0	0	0	HIV	135	80	250	100	155	Vintor	4000/2000	130	11
0	0	0	0	n	180	96	250	140	250	Vintor	4000/2000	134	12
0	0	0	0	N	140	80	200	140	140	Zyrop	4000	50	4
1	0	0	0	n	170	96	250	160	240	Vintor	4000/2000	114	10
0	0	0	0	n	170	96	250	160	240	Zyrop	2000	28	4
0	0	0	0	N	140	90	180	90	110	Eprex/Vi	4000/2000	100	11
0	0	0	0	n	120	60	225	40	90	Vintor	2000/4000	78	11
0	0	0	0	n	170	84	180	90		Vintor	4000/2000	176	12
0	0	0	0	n	150	100	180	40	140	Zyr/Vint	4000/2000	67	7
0	0	1	0	n	180	90	200	70		Vintor	4000	62	6
0	0	0	0	n						Zyr/Vin	4000/2000	45	3
0	0	0	0	n	160	80	250	100	140	Vintor	4000/2000	39	8
0	0	0	0	n						Zyr/Vin	4000	198	12
0	0	0	0	n						Vintor	4000/2000	31	4
0	0	0	0	R BKA	140	80	250	110	190	Vi/Zy/WE	4000/2000	109	12
0	0	0	0	n	140	100	250	100	160	Vin/Zyr	4000/2000	97	11
0	1	0	0	Aoricdis	130	70	300	100	120	Cresp/Zy	40/4000	100	10
0	1	0	0	n	136	79	250	120	220	No EPO			12
0	1	0	0	n	170	96	250	160	240	Vintor	4000/2000	62	12
0	0	0	0	n	170	70	250	60	180	Vintor	2000	51	12
0	0	0	0	n	150	90	190	85	150	Vintor	2000	81	12
0	0	0	0	n	106	70	200	88	100	Vintor	4000/2000	12	12
0	0	0	0	n	140	80	250	95	120	Zyrop	4000	116	4
0	0	0	0	n	180	90	200	70	120	Vintor	2000	38	5
0	0	0	0	n						Zyrop	4000	60	3

0	0	0	0	n	140	80	250	86	110	Vintor	4000/2000	42	12
0	1	0	0	Posttran	140	70	200	100	130	Zyrop	4000	28	4
0	0	0	0	n	160	80	275	190	140	Vintor	4000	26	4
0	0	0	0	n	160	80	200	130	70	Vintor	2000	16	3
0	0	1	1	n	130	80	250	120	170	Vintor	2000	71	12
0	0	0	0	n	150	90	200	90	100	Zyrop	2000/4000	40	8
0	0	0	0	n	170	90	175	90	130	Vintor	4000/2000	51	6
0	0	0	0	n	150	80	200	100	180	Zyrop	4000	36	3
0	0	0	0	n	140	70	250	100	160	Vintor	2000	18	12
0	0	1	1	n	140	80	155	190	140	Eprex	4000	100	5
0	0	0	0	n						Zy/Vi/Cr	4K/25	74.03	12
0	0	0	0	n	124	78	250	90	135	Zyrop	2000/4000	116	12
0	1	0	0	n	160	90	250	130	140	Vintor	2000	27	7
0	0	1	0	n	120	60	225	40	90	Vintor	4000	14	3
0	0	0	0	n	130	80	250	90	110	Zyrop	2000	24	4
0	0	0	0	n	160	90	250	130	140	Vintor	4000/2000	105	12
0	0	0	0	n	140	80	225	120	100	Zyrop	2000/4000	72	12
0	0	0	0	n	160	90	210	90	140	Zyrop/Vi	2000/4000	107	12
0	0	0	0	n	140	80	200	85	125	Vintor	2000	60	12
0	0	0	0	n	150	90	280	160	250	Vintor	2000	2	12
0	0	0	0	n	180	90	200	80	150	Zyrop	2000	37	6
0	0	0	0	n	140	80	200	90	110	Vin/Zy	4000	56	6
0	0	0	0	n	140	80	250	100	110	Vintor	4000/2000	43	12
0	0	0	0	n	160	90	250	100	180	Vintor	4000/2000	72	12
0	0	0	0	n	138	80	250	150	300	Zyrop	2000	73	12
0	0	0	0	n	150	80	250	180	240	EPO	4000/2000	24	12
0	0	0	0	n	110	70	300	160	170	Vintor	4000/2000	62	12
0	0	0	0	n	140	80	200	140	140	Zyp/Eprx	4000	62	3
0	0	0	0	n	140	80	250	100	180	Zyro/Vin	4000/2000	79	12
0	0	0	0	n	140	80	250	130	135	Cres/Zyr	25/2k/4K	51.13	12
0	0	0	0	n	140	80	200	140	140	No EPO			3
0	0	0	0	HIV	180	100	250	130	120	Vintor	4000/2000	12	12
0	1	0	0	n	170	90	175	90	110	Vintor	2000/4000	34	4

0	0	0	0	n	160	80	250	100	200	Vintor	4000/2000	112	12
0	0	0	0	n	160	80	275	190	140	Vintor	2000	55	12
0	0	0	0	n	140	80	200	120	200	Vintor	2000/4000	105	12
0	0	0	0	n						Vintor	2000/4000	73	10
0	1	0	0	n	140	90	200	100	120	Cresp	40	14	9
0	0	0	0	n	180	90	250	100	100	Vintor	2000/4000	113	12
0	0	0	0	n	130	80	250	90	120	Zyrop	4000/2000	102	11
0	0	0	0	n	160	90	300	110	200	Vintor	2000	43	12
0	0	0	0	n	170	90	250	180	180	Vin/Zyr	4000/2000	92	12
0	0	0	0	n	140	80	200	140	300	Vintor	4000/2000	102	12

Dose.Kg.W	No.of.antiH	Intra.Hypot	Intra.Hyper	Intra.Cram	Intra.Chills	Flow.proble	Flow.prob1	AVF.stenos	AVF.CVS	AVF.Throm	AVF.Pseudo	AVF.Steal	AVF.Localh
29.59	1	2	0	0	0	0		0	0	0	0	0	0
136.22	2	0	0	0	0	0		0	0	0	0	0	0
69.39	2	0	0	0	0	0		0	0	0	0	0	0
42.73	3	2	0	2	0	0		0	0	0	0	0	0
137.02	1	0	0	0	0	0		0	0	0	0	0	0
15.38	3	0	0	0	0	3	Low Qb	0	0	1	0	0	1
79.93	0	0	2	0	0	0		0	0	1	0	0	0
79.23	1	2	0	0	0	3		0	0	0	0	0	0
18.48	1	0	0	0	0	1	Low Qb	0	0	0	0	0	1
41.42	2	0	0	2	0	0		0	0	0	0	0	0
3.01	2	0	0	3	0	0		0	0	0	0	0	0
53.84	1	0	0	0	0	0		0	0	0	0	0	0
77.32	5	0	0	0	0	1	Low Qb	0	0	0	0	0	0
21.3	2	0	0	0	0	0		0	0	0	0	0	0
63.38	2	0	0	0	0	0		0	0	0	0	0	0
75.47	2	3	0	0	0	2	Ooozing	0	0	1	0	0	1
36.28	1	0	0	0	0	0		0	0	0	0	0	0
1.92	2	3	0	3	0	3		1	1	0	0	0	0
44.98	0	0	0	0	0	0		0	0	0	0	0	0
53.58	0	0	0	0	1	0		0	0	0	0	0	0
59.49	1	0	1	4	0	0		0	0	0	0	0	0
93.22	3	0	0	0	0	0		0	0	0	0	0	0
98.22	1	0	0	0	0	1	High VP	0	0	1	0	0	1
39.18	0	0	0	0	0	1		0	0	1	0	0	0
55.72	3	0	0	0	0	0		0	0	0	0	0	0
96.81	1	3	0	3	0	0		0	0	0	0	0	0
55.8	2	0	0	0	0	0		0	0	0	0	0	0
104.21	2	0	0	0	0	1	Low Qb	0	0	0	0	0	0
86.3	3	1	0	3	0	0		0	0	0	0	0	0
88.99	3	0	3	0	0	0		0	0	0	0	0	0
125.31	1	0	0	0	0	0		0	0	0	0	0	0
74.12	2	0	0	0	0	0		0	0	0	0	0	0

75.59	0	0	0	0	0	0		0	0	0	0	0	0
21.51	2	0	0	0	0	0		0	0	1	0	0	0
72.94	1	9	0	12	0	2	AV intercor	0	0	0	0	0	0
85.1	0	0	0	0	0	0		0	0	0	0	0	0
53.99	5	0	8	0	0	0		0	0	0	0	0	0
73.26	1	0	0	0	0	0		0	0	0	0	0	0
32.47	2	0	0	0	0	0		0	0	0	0	0	0
79.36	2	0	0	0	0	0		0	0	0	0	0	0
92.43	3	0	0	0	0	0		0	0	0	0	0	0
27.74	0	0	0	3	0	3	Low Qb	0	0	0	0	0	0
51.92	2	0	0	3	0	1	P/C mech.	0	0	0	0	0	0
0	3	0	0	0	0	0		0	0	0	0	0	0
35.97		0	0	0	0	0		0	0	0	0	0	0
31.86	2	0	0	0	0	0		0	0	0	0	0	0
31.7	3	0	0	0	0	2	Low Qb	0	0	0	0	0	0
45.37	4	0	0	0	0	0		0	0	0	0	0	0
83.55	2	0	0	0	0	0		0	0	0	0	0	0
0	1	0	0	0	0	0		0	0	0	0	0	0
49.55	1	0	0	0	0	0		0	0	1	0	0	0
32.41	2	0	0	0	0	1	High VP	0	1	0	0	0	0
13.92	2	0	0	0	0	1		0	0	0	0	0	0
64.77	2	0	0	0	0	1		1	0	1	0	0	0
38.92	3	0	0	0	0	0		0	0	0	0	0	0
36.48	4	0	0	0	0	0		0	0	0	0	0	0
62.13	1	0	0	0	0	0		0	0	0	0	0	0
83.71	1	0	0	0	0	0		0	0	0	0	0	0
137.74	4	0	0	0	1	0		0	0	0	0	0	0
65.18	0	0	0	4	0	2	Low Qb	1	0	0	0	0	1
71.97	2	0	0	0	0	0		0	1	0	0	0	0
55.38	4	0	0	0	0	0		0	0	0	0	0	0
22.18	2	0	0	0	0	0		0	0	0	0	0	0
102.55	3	0	0	0	0	0		0	0	0	0	0	0
25.78	2	0	0	0	0	0		0	0	0	0	0	0

52.58	1	0	0	0	1	6		1	1	1	0	0	0
89.58	1	0	0	0	0	0		0	0	0	0	0	0
39.66	2	0	0	0	0	0		1	0	1	0	0	0
58.53	1	0	0	0	2	0		0	0	0	0	0	0
53.58	3	0	0	0	0	0		0	0	0	0	0	0
22.68	2	0	0	0	0	0		0	0	0	0	0	0
36.05	0	0	0	0	0	0		0	0	0	0	0	0
141.25	3	0	0	0	0	0		0	1	0	0	0	0
27.14	3	0	0	0	0	0		0	0	0	0	0	0
25.79	1	0	0	0	0	0		0	0	0	0	0	0
65.93	2	0	0	0	0	0		0	0	0	0	0	0
68.25	3	0	0	0	0	0		0	0	0	0	0	0
50.89	3	0	0	0	0	0		0	0	0	0	0	0
114.98	0	0	0	0	0	1	High VP	0	0	0	0	0	1
0	1	2	0	0	0	0		0	0	0	0	0	0
42.38	1	0	0	0	0	3	Low Qb	1	0	1	0	0	0
0.93	1	0	0	0	0	0		0	0	0	0	0	0
20.36	3	0	0	0	0	0		0	0	0	0	0	0
30.17	2	0	0	0	2	0		0	0	0	0	0	0
179.04	1	0	0	0	0	0		0	0	0	0	0	0
39.16	1	0	0	2	0	4	Broken Vsit	0	0	0	0	0	0
43.75	3	0	0	0	0	0		0	0	1	0	0	0
126.74	1	0	0	0	0	2	Low Qb	1	0	1	0	0	0
129.03	1	0	0	0	0	1	AV intercor	0	0	0	0	0	0
123	1	0	0	0	0	2	AV intercor	1	0	1	0	0	1
72.87	1	0	0	0	0	3	JVC Low Qb	0	0	1	0	0	0
113.36	1	0	0	0	0	1		0	0	0	0	0	0
144.42	0	0	0	0	0	6	Low Qb	1	0	1	0	0	1
80.97	1	0	0	0	0	1	AV Intercor	0	0	0	0	0	0
204.1	3	0	0	0	0	0		0	0	0	0	0	0
67.72	2	0	0	2	0	0		0	0	0	0	0	0
50.5	2	0	0	0	0	0		0	0	0	0	0	0
66.27	4	0	0	0	0	0		0	0	0	0	0	1

21.4	2	0	0	0	0	0		0	0	0	0	0	0
88.69	3	0	2	0	0	0		0	0	0	0	0	0
51.57	1	0	0	0	0	1	Low Qb	0	0	0	0	0	0
107.2	0	0	0	0	0	1	Low Qb	0	0	0	0	0	1
173.07	3	0	0	3	0	0		0	0	0	0	0	0
33.5	3	4	0	2	0	2	High VP	1	0	1	0	0	0
151.67	1	0	5	0	0	0		0	0	1	0	0	0
53.25	2	0	0	0	0	0		0	0	0	0	0	0
71.84	1	3	5	2	0	4		0	0	1	0	0	0
80.52	1	0	4	0	0	3	JVC Low Qb	0	0	0	0	0	0
117.64	0	2	0	2	0	0		0	0	0	0	0	0
96.94	4	0	0	0	0	0		0	0	0	0	0	0
49.91	3	0	0	0	0	0		0	0	1	0	0	0
53.19	3	0	0	0	0	2	Cannulat.P	2	0	1	0	0	2
58.23	1	0	0	0	0	0		0	0	0	0	0	0
109.18	1	0	0	0	0	2	High VP	0	0	0	0	0	2
97.1	5	0	0	0	0	0		0	1	1	0	0	0
79.48	3	0	0	0	0	2	AV Intercor	0	0	0	0	0	0
108.5	1	0	0	0	0	0		0	0	0	0	0	0
29.71	1	0	0	0	0	1	Low Qb	0	0	0	0	0	1
146.45	1	0	0	0	0	0		0	0	0	0	0	0
71.51	1	0	0	0	0	0		0	0	2	0	0	0
68.72	1	6	1	0	0	0		0	0	0	0	0	0
67.67	3	0	0	0	0	0		0	0	0	0	0	0
95.23	0	2	0	0	0	0		0	0	0	0	0	0
0	4	3	0	6	0	0		0	0	0	0	0	0
31.37	1	3	0	4	0	0		0	0	0	0	0	0
30.64	0	0	0	0	0	0		0	0	0	0	0	0
66.28	2	0	0	0	0	3		1	0	0	0	0	0
6.78	1	0	0	0	0	0		0	0	0	0	0	0
290.36	2	1	0	0	0	2	Low Qb	1	0	1	0	0	0
54.01	2	2	0	0	0	2		0	0	0	0	0	0
161.94	0	0	0	0	0	0		0	0	0	0	0	0

25.24	3	3	0	4	0	1		0	0	0	0	0	0
56.79	4	0	0	0	0	1	High VP	0	0	0	0	0	0
55.61	0	0	0	0	0	0		0	0	0	0	0	0
25.43	3	0	0	0	0	0		0	0	0	0	0	0
47.9	1	2	0	5	0	2		1	0	1	0	0	0
31.37	3	0	0	0	0	2	High VP	0	0	2	0	1	1
74.02	2	3	0	3	0	5	Low Qb	1	0	1	0	0	0
74.3	0	0	0	0	0	0		0	0	1	0	0	0
13.84	2	0	0	0	0	0		0	0	0	0	0	0
140.05	2	2	0	0	0	2		1	0	2	0	0	0
51.74	1	0	0	0	0	0		0	0	0	0	0	0
96.98	3	0	0	0	0	1	High VP	0	0	0	0	0	0
34.61	4	0	0	0	0	0		0	0	0	0	0	0
37.78	0	2	0	0	0	3		0	0	1	0	0	0
46.28	0	0	2	0	0	3	Low Qb	0	0	0	0	0	0
64.1	2	4	0	4	0	0		0	0	0	0	0	0
51.28	3	2	0	8	2	6		0	0	1	0	0	0
87.56	4	0	0	3	0	2	Low Qb	1	0	1	0	0	1
31.18	3	0	0	0	0	0		0	0	0	0	0	0
0.82	2	0	0	2	1	0		0	0	0	0	0	0
64.68	2	1	0	0	0	0		0	0	0	0	0	0
86.15	2	0	0	0	0	1	Low Qb	0	0	0	0	0	0
34.45	3	0	0	0	1	0		0	0	0	0	0	0
50.34	1	0	0	2	0	0		0	0	0	0	0	0
32.27	1	0	0	5	0	0		0	0	0	0	0	0
9.92	0	4	0	3	0	1	High VP	0	0	0	0	0	0
58.16	0	0	0	0	0	0		0	0	0	0	0	0
165.5	3	2	0	0	0	0		0	0	0	0	0	0
33.76	3	0	0	2	0	0		0	0	0	0	0	0
33.24	1	2	0	4	1	0		0	0	0	0	0	0
0	2	0	2	0	0	0		0	0	0	0	0	0
9.05	3	0	3	2	0	0		0	0	0	0	0	0
65.57	2	0	0	0	0	1	Noflow.Gui	0	0	0	0	0	0

89.74	0	1	0	4	0	1	LowQbAVF	0	0	0	0	0	0
35.25	1	0	0	4	0	0		0	0	0	0	0	0
96.15	1	8	0	12	0	7		1	0	0	0	0	0
54.76	1	0	0	0	0	0		0	0	0	0	0	0
	1	0	0	0	0	2	AV inter	0	0	0	0	0	0
9.05	4	0	0	0	0	0		0	0	0	0	0	0
98.64	1	0	0	0	0	0		0	0	0	0	0	0
33.75	3	0	0	4	0	0		0	0	0	0	0	0
59.97	4	0	3	0	0	0		0	0	0	0	0	0
75.44	2	3	0	0	1	3		0	2	1	0	0	0

AVF.Infecti	AVF.Highflo	AVF.Infect1	NTC.Inserti	Inserion.Cx	NTC.Throm	NTC.Infecti	NTC.Infect1	NTC.Infect2	NTC.Breaka	NTC.Vascul	TC.Mech.D	TC.Cath.inf	TC.CRBSI
0	0	0.0	0		0	1	NFGNB		0	0	0	0	0
0	0	0.0	0		0	1	CoNS		0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	1	1	CoNS	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0		0	0			0	0	0	0	0
0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0

0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0		0	1	Klebs		0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0		0	1	Enteroba		0	0	0	0	0
0	0	0	0	0	1	1	CoNS	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	Kleb-CRO	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	1	DSA plac	1	1	Enteroba		0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	00	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0

0	0	0	0	0	1	2	NFGNB	CoNS	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	00	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	DSA plac	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	2	Serratia ma	Serrati	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	1	1	CoNS	0	0	0	0	0	0
0	0	0	0	0	1	0	0	0	1	0	0	0	0
0	0	0.0	0		0	0			0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0		0	0	0	0	0	0	0	0	0
1	0	Enteroba	0		2	2	S.aureus	S.aureus	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0		0	0	0	0	0	0	0	0	0
0	0	0	1	DSA plac	1	1	S.aureus		0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0

0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0		0	1	Anero Sp	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	Klebsiel	0	0	0	0	0	0
0	0	0.0	0	0	1	0	0	0	0	0	0	0	0
0	0	0.0	0		0	0			0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0		0	0			0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0		0	0			0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0		0	0			0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	00	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0		0	0	0	0	0	0	0	0	0
1	0	Enteroco	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0		0	0			0	0	0	0	0

0	0	0	0	00	0	0	0	0	0	0	0	0	0
0	0	0.0	0		0	0			0	0	0	0	0
0	0	0.0	0		0	0			0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	Entero+Col	1	0	0	0	0	0
0	0	0.0	0		0	1			0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0		0	0			0	0	0	0	0
0	0	0	1	Hematoma	1	1	Enterobact	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	DSA plac	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	`0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0		0	0			0	0	0	0	0
0	0	0	0	0	0	0	00	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.0	0		1	1	CoNS		0	0	0	0	0

0	0	0	0	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

TC.Infect1	TC.Mural.T	TC.CVS	TC.Fibri	Mean.Hb	Mean.UR	sp.KT.v	Mean.Crea	Mean.Na	Mean.K	Mean.HCO	Maen.Cal	Maen.Phos	Mean.Albu
0	0	0	0	8.1	55	0.97	6.8	134	4.5	12	9	3.6	3.2
	0	0	0	7.3	82	1.67	5.1	137	4.8	17	9	4.4	3.6
0	0	0	0	11.8	68	1.31	5.8	138	5.6	19	8.7	4.5	4
0	0	0	0	8.2	84	1.72	6.9	128	4.2	20	9	3	4
0	0	0	0	10.5	73	1.44	12	137	5.3	16.6	8.3	5.5	3.8
0	0	0	0	10.8	61	1.13	7.8	139	4	20	7.9	4	3.8
0	0	0	0	8.2	72	1.41	6.8	138	4.8	16	8.7	2.1	3.7
0	0	0	0	9.3	74	1.46	11.2	135	5.8	17	8	3	4
0	0	0	0	10.7	60	1.1	15.8	140	4.5	17	8.9	3	4.3
0	0	0	0	11.5	75	1.49	7.1	132	4.4	24	8.2	5.2	4
0	0	0	0	12.5	70	1.36	13.01	138	4.7	18.2	7.8	4.1	4.2
0	0	0	0	8	70	1.36	12	140	5.2	17.5	8.2	3.7	4
	0			8.5	55	0.97	11.74	131	4.4	18.2	8.6	5.5	3.9
0	0	0	0	0	67	1.28	11	134	5.5	18	7.5	4.9	4
0	0	0	0	7.5	65	1.23	9.5	14	4.4		8.5	2.5	3.4
0	0	0	0	8.5	75	1.49	11.6	142	6.3	21.2	7.8	3.8	4
0	0	0	0	11.5	68	1.31	8.7	138	5.4	7	7.6	6.2	4.2
0	0	0	0	10.3	64	1.2	8.1	130	5.8	25	8.2	4	3.5
0	0	0	0	8.9	46	0.74	6.3				6.2	3.8	2.3
0	0	0	0	10.6	65	1.23	5.5	140	4.8	26	9.1	3	3.7
0	0	0	0	11	65	1.23	9	138	5.5	26.1	8.6	4.2	3.4
0	0	0	0	13.5	67	1.28							4.4
0	0	0	0	7.9	68	1.31	7.5	138	6	18	9	4	3.7
0	0	0	0	12.9	61	1.12	8.4	136	4.5	20.1	9.2	5.1	4.1
0	0	0	0	12.6	78	1.57	8	135	5.8	22	7.9	2.9	3.6
0	0	0	0	9.6	82	1.67	6.5	137	5.6	0	8.2	4.5	3.9
0	0	0	0	9.4	71	1.39	6	130	6.3	21	9	4.8	3.6
0	0	0	0	8.5	56	1	8.9	137	4.7	16	8.4	5.6	3.7
0	0	0	0	10.2	75	1.49							4.1
0	0	0	0	9.5	66	1.26	17.6	136	6	22	6.8	5.8	3.8
0	0	0	0	12.1	69	1.33	8.3	133	5	21	8.3	3.1	4
0	0	0	0	12.5	58	1.05	4.9	127	5.5	19	7.9	3.6	3.1

0	0	0	0	11	70	1.36	11.7	136	5.5	21	8.6	3.5	3.6
0	0	0	0	10.8	56	1	6.8	133	5.7	19	8.4	2.8	3.8
0	0	0	0	11.6	68	1.31	7.6	139	4.7	18.6	8.7	5.2	4
0	0	0	0	9.3	70	1.36	8.5	134	6	19.1	9.1	6.7	4.3
0	0	0	0	7.8	58	1.05	13.5	140	4.5		8.6	5.1	3.5
0	0	0	0	9.8	69	1.33	14.2	137	4.9	17	8.8	8	4.2
0	0	0	0	9.5	74	1.46	11.6	137	5.1	19	8.3	3.5	4
0	0	0	0	10.2	65	1.23	10	138	4.2	17	9.8	6.9	4
0	0	0	0	10.2	70	1.36	10.1	139	5.2	18	7.6	6.2	4.1
0	0	0	0	12.1	62	1.15	9	136	5.5	19	7.2	4.9	3.9
0	0	0	0	8.5	84	1.72	8.6	139	4.9	19.8	9	3.1	4.2
0	0	0	0	14	64	1.2	10.2	133	5	23	8.4	4	4
0	0	0	0	10.9	67	1.28	6.1	138	4.8	0	8.5	4.9	3.5
0	0	0	0	7.4	69	1.32	7.9	137	5.2	25.4	8.1	5.5	3.6
CoNS	1	0	0	10	52	0.89	9.2	143	5.1	20	8	3.5	3.7
0	0	0	0	10.2	66	1.26	11	139	5.1	18	8.8	3.6	4
0	0	0	0	11.1	75	1.49	5.4	134	5.4	18	9.2	4.1	3.6
0	0	0	0	13.2	60	1.1	6.8	133	5.6	18	8.9	3.2	3.7
0	0	0	0	12.1	68	1.31	6	135	4.5	17	9	5.2	3.4
0	0	0	0	9.2	65	1.23	8.87	138	5.7	22	8.9	1.8	3.9
0	0	0	0	13.5	72	1.41	7.8	134	5.5	18	8.2	4	3.8
0	0	0	0	11.2	58	1.05	6.7	138	6.1	17.2	7.9	3.4	3.5
0	0	0	0	11.5	65	1.23	9.1	130	4.9	16	8.5	4.6	3.6
0	0	0	0	8.8	65	1.23	6.6	135	6.2		8.2	3.2	3.4
0	0	0	0	9.5	64	1.2	7.5	141	4.2	21	8.9	2.6	3.1
0	0	0	0	7.9	74	1.46	6.5	130	4.8	20	8	4.7	3.4
0	0	0	0	12.1	78	1.57	7.9	137	4.8	20	8.2	4.9	3.6
0	0	0	0	9.6	55	0.97	6.5	135	5.2	19	8.4	2.5	3.9
0	0	0	0	8.8	48	0.79	8.2	134	4.2	17.5	8.4	3.9	4
0	0	0	0	9.6	77	1.54	8.1	141	5.7		9	3.8	3.3
0	0	0	0	12.8	65	1.23	10.2	141	5.5	17	8	5.6	4
0	0	0	0	10.1	75	1.49	13	131	5.7	19	8.5	5.1	4.2
0	0	0	0	11.5	67	1.28	8.8	140	4.4	0	8.2	4.4	4

0	0	0	0	8.6	55	0.97	11.5	132	5.3	22	9	5.4	4.8
0	0	0	0	10.5	58	1.05	5	133	6	19	8.4	2.8	3.6
0	0	0	0	10.8	70	1.36	8	136	5.1	23	8.4	4.3	3.8
0	0	0	0	9.4	66	1.26	7.2	140	5.5	20	9	4.1	4.5
0	0	0	0	12.5	58	1.05	6.1	127	5.8	17	8.2	3.5	3.8
0	0	0	0	9	73	1.44	9	135	4.7	15	8.2	4.2	3.7
0	0	0	0	7.5	72	1.41	7.9	138	6	22	8.8	4.8	4
0	0	0	0	9.6	74	1.46	8.5	138	5.6		8.6	3.8	4.1
0	0	0	0	13.8	56	1	13.3	139	4	24.1	7	4	3.9
0	0	0	0	13.1	71	1.39	5.2	138	4.9	19.9	8.9	4	3.9
0	0		0	11.5	71	1.39	7.98	128	4.4	19.9	8.1	7.6	3.5
0	0	0	0	9.5	55	0.97	7.8	137	5.2	24	8.1	4.2	3.9
0	0	0	0	7.2	65	1.23	12.5	136	4.8	22	8.8	5.4	3.9
0	0	0	0	11.1	77	1.54	8.1	135	3.8	21	8.8	4.5	4.2
0	0	0	0	10.6	73	1.44	7.8	132	4.9	23.2	8.4	5.5	4.1
0	0	0	0	11	67	1.28	13.4	137	5.4	18	7.9	3.8	3.7
0	0	0	0	6.8	72	1.41	8.9	136	4.7	14	9.1	3.6	3.9
0	0	0	0	12.9	64	1.2	8.9	136	5.6	22	8.1	5.6	4.3
0	0	0	0	8.5	68	1.31	11.1	130	6	16	8.5	3	4
0	0	0	0	10.2	63	1.18	4.5	134	3.9	25	8.4	2.3	3.3
0	0	0	0	5.5	60	1.1	5.1	127	4.7	14	9.3	3.9	3.5
	0	0	0	9.7	62	1.15	20.15	134	5	20	8.3	4.4	4.7
0	0	0	0	11.5	53	0.92	5.5	138	5	18.5	8.2	3.5	3.5
0	0	0	0	7.8	58	1.05	9.1	134	5.9	19	8.2	4.5	3.3
0	0	0	0	11.5	63	1.18	10.17	133	5.4	16.3	8.5	6.6	3.6
0	0	0	0	7	67	1.28	10.1	136	5.5	16.8	6.1	4.7	
0	0	0	0	10.1	61	1.13	8.3	132	4.8	17	8.5	5	3.5
0	0	0	0	12.8	65	1.23	11.4	140	4.4		10.3	5.8	3.8
0	0	0	0	11.1	60	1.1	11.1	134	5.1	27	8.3	4.1	3.8
0	0	0	0	12.1	72	1.41	10.4	133	6.1	14	10	5.8	4.7
0	0	0	0	11.8	74	1.46	12.8	136	6.2	17.7	8.4	4	3.9
0	0	0	0	12.2	57	1.02	7.95	137	4.7	21	8.7	3.7	4.1
0	0	0	0	10.4	71	1.4	7.99	139	5.2	12	8.7	4.3	4.1

0	0	0	0	7.5	60	1.1	7.15	131	4.5	26	8.5	3.4	4.4
0	0	0	0	10.2	72	1.41	7.6	135	5	19.1	9	5.2	4.2
0	0	0	0	10.1	59	1.07	13	134	5.8	19	8.6	5.1	4
0	0	0	0	9.5	64	1.19	6.2	141	4.7	17.8	8.2	4.9	3.6
0	0	0	0	8.1	80	1.62	8.2	136	4.9	19.4	8.9	5.5	4
0	0	0	0	13.1	68	1.31	8.5	138	5.8	22.3	7.3	6.8	3.8
0	0	0	0	12	67	1.27	5.1	134	5	20.8	8.4	3.3	4
0	0	0	0	9.6	47	0.76	8.6	128	4.3	23	8	4.2	2.6
0	0	0	0	8.4	59	1.07	11.5	136	5.4	18.7	8	4.8	4
0	0	0	0	9.5	56	1	8.8	134	5.2	22	8.1	4.8	2.5
	0	0	0	10.5	60	1.1	8.2	120	2.7	27	9.6	4.5	7.8
0	0	0	0	9	61	1.13	12.8	131	4.8	19.5	9.5	6.1	3.9
0	0	0	0	9.2	90	1.88	10.4	127	4.3	23	8.2	3.9	3.9
0	0	0	0	9.1	63	1.18	7.2	140	5.2	20.4	26	6.2	3.6
	0			8.5	55	0.97	7	137	4.2	21	8.3	4.4	3.6
0	0	0	0	11.1	61	1.13	7.1	140	5.2	18	7.4	7.2	3.5
0	0	0	0	9.4	66	1.26	7.8	138	4.8		7.8	2.9	3.3
0	0	0	0	9.7	57	1.02	10.2	142	5.2	14.8	9.4	5	3.8
0	0	0	0	10.1			8	133	4.8	18	9.2	8.1	4.3
0	0	0	0	8.5	46	0.74	7.6	129	5	8	4.9	5	2.9
	0			9.6	78	1.57	11	130	4.2	19	8.3	5.3	3.7
	0			11.9	70	1.36	6.8	136	4	25.6	8.6	3	4.2
0	0	0	0	10.1	66	1.26	10.6	134	4.4	18	8.6	3.9	3.6
0	0	0	0	13	65	1.23	11	138	5.3	21	9.1	5.6	4.3
0	0	0	0	9.7	64	1.2	13	137	5.7	16	8.2	5.6	3.6
0	0	0	0	15.2	62	1.15	12.2	141	3.5	15	8.8	6.6	4.2
0	0	0	0	13	62	1.15	6.3	136	5		8.2	4.8	4.2
0	0	0	0	10.8	62	1.15	9.8	137	5.4	21	7.5	2.9	3.5
0	0	0	0	12.9	71	1.39	10.1	137	6	23.3	9	5.4	4.3
0	0	0	0	13	61	1.13	6.7				8.4	3.4	3.8
0	0	0	0	7.2	64	1.21	6	139	5.8	18.1	8.8	1.9	3.6
0	0	0	0	8.9	67	1.28	7.5				8.8	2.9	4.2
	0	0	0	8.9	72	1.41	7.6	140	5.1	15.7	9	4.1	3.8

0	0	0	0	11.6	63	1.18	11	138	4.6	19	8.8	5.4	4.2
	0			11.2	71	1.39	7.6	143	5.3	7.1	8	3.9	3.9
	0			8.8	65	1.23	3.8	138	3.8	24	9.7		3.2
0	0	0	0	13.3	63	1.18	13.6	141	5.7		8.6	4.7	4.2
0	0	0	0	9.5	72	1.41	11.5	133	6	20	11.5	6	3.6
0	0	0	0	11.5	54	0.94	5.1	136	4.7	21	8.4	4.2	4
0	0	0	0	12	75	1.49		135	5.5	15	9	4.7	4
0	0	0	0	11.5	65	1.23	11.5	136	3.9		9	7	3.8
0	0	0	0	8.8	74	1.46	10.67	134	5.4		7.8	1.9	3.9
0	0	0	0	11.2	60	1.1	7.5	136	5.5	17	8.7	3.9	4.1
	0	0	0	9.8	71	1.39	9.5	135	4.2	22	8.9	3.5	3.8
0	0	0	0	11.8	66	1.25	9.8	138	5.5	23	9	3.8	4.3
	0	0	0	10.6	81	1.65	6.2	137	5.4	23	9.1	6.8	3.1
0	0	0	0	7.5	78	1.57	8.6	141	3.3	17.3	7.3	5.1	4.2
0	0	0	0	10.8	73	1.44	9	136	5.2	21.4	9.2	6.1	3.5
0	0	0	0	10.5	81	1.65	7.9	135	6	14	9	6.5	3.8
0	0	0	0	12.8	70	1.36	11.2	137	4.6	27.1	9	4.9	4.6
0	0	0	0	11.4	68	1.31	7.9	133	5.8	13	8.4	5.4	3.8
0	0	0	0	10.3	63	1.18	7.9	141	6	19	7.9	3.3	3.8
0	0	0	0	13.8	62	1.15	15.5	140	6	19.4	8.2	6.8	4.2
0	0	0	0	9.1	78	1.57	9.5	135	5.9	16	8.5	4.3	4.2
	0	0	0	10.2	67	1.28	6.3	137	4.6	26	9.1	4.6	4.3
0	0	0	0	11.5	68	1.31	6.8	132	5.2	18	8.4	4.9	3.5
0	0	0	0	10.9	73	1.44	6.9	138	4.6	19	8.5	5.8	3.8
0	0	0	0	11.8	66	1.26	16.8	135	5.2	16	7.8	6.2	3.9
0	0	0	0	12.5	68	1.31	9	140	5.5	23.2	8.8	4.5	3.7
0	0	0	0	10.5	84	1.72	11.5	137	5.4	17.9	8	6.5	4.3
0	0	0	0	10.2	83	1.7	5	132	4.3	26	7.2	4.3	2.5
0	0	0	0	11	56	1	4	132	4.1	21	8.3	4	3.8
0	0	0	0	10.1	76	1.52	6.4	141	5.1	16	8.4	4.8	3.5
0	0	0	0	10.5	65	1.23	11.5				6.1	4.9	4.3
0	0	0	0	9.1	60	1.1	12.5	141	3.6	17.2	8.8	5.6	4
	0			10.4	52	0.89	7.8	132	3.8	22	8.8	5.6	3.7

0	0	1	1	9.8	75	1.49	7.8	138	5.8	17	8.8	4.5	3.5
0	0	0	0	11	65	1.23	8.8	137	5.4	17	8.9	6	4
0	0	0	0	7.5	70	1.36	7.8	140	4.6	19	9	2.6	3.8
0	0	0	0	9	59	1.07	15.5	139	5.9	17	7.9	6	3.6
0	0	0	0	10	71	1.39	9.8	136	3.9	25	8.2	5.5	4.6
0	0	0	0	12.8	82	1.67	6.1	135	5.7	21	8.5	3.5	3.4
0	0	0	0	10.1	78	1.57	5	136	4.2	27	9	3.4	3
0	0	0	0	10.1	79	1.59	9	138	6.2	20.1	8	4.7	4.1
0	0	0	0	8.4	68	1.31	14.5	138	5.8	23	9.2	4.5	4.3
0	0	0	0	9.8	72	1.41	10.1	138	5.6	17	8.4	6	4.2

Mean.SGOT	Mean.SGPT	Mean.PTH	Mean.TSAT	Mean.Ferri	HBV	HCV	HIV
62.5	19		18	695	0	0	0
65	46	109			0	0	0
20	11	340	25	121	0	0	0
10	9	36.5	24	513	0	0	0
19	13	128	34	506	0	0	0
10		719			0	0	0
18	11	102	31	150	0	0	0
18	6		40	456	0	0	0
12	10				0	0	0
24	15	430	22	381	0	0	0
	16	1064			0	0	0
7	15	1728			0	0	0
10		251	12	71	0	0	0
12	9	601			1	1	0
10	9	470	30	215	0	0	0
					0	0	0
18	10	1310	35	865	0	0	0
19	15	321	7	111	0	0	0
10					0	0	0
10	8	364	9		0	0	0
13	5	74.2	14	87	0	0	0
		418	70	3558	0	1	0
11	8	66	21	365	0	0	0
18	11	232	35	280	0	0	0
10	10	200			0	0	0
25	27	1479	22	212	0	0	0
15	11				0	0	0
14		1900	14	90.6	0	0	1
34					0	0	0
10	5		28	135	0	0	0
12	10	192	17		0	0	0
37	33				1	0	0

6	6	1015	16	102	0	1	0
20	10	224			0	0	0
18	17	618	12	394	0	0	0
15	10	42			0	0	0
6	6	679		206	0	0	0
13	17	314	36	772	0	0	0
18	10				0	0	0
18	13	168	18	806	0	0	0
9	5	850	10		0	0	0
13	18	460	18	88	0	0	0
11	16				0	0	0
6	6	550			0	0	0
					0	0	0
14	10	776		54	0	0	0
		673			0	0	0
10	6	779	16	218	0	0	0
16	10				0	0	0
14	11				0	0	0
10		496			0	0	0
18	11	98	33	1273	0	0	0
	10	658	21	248	0	0	0
28	12				0	0	0
14	10				0	0	0
	10		32	75	0	1	0
25	45	552	13	103	0	0	0
18	12	170	7	117	0	0	0
16	7	624	31	558	0	0	0
23	9				0	0	0
14	7	123	22	280	0	0	0
		426	20	212	0	0	0
28	9	538			0	0	0
22	16	79			0	0	0
13	6	677	29	118	0	0	0

	8	194	30	201	0	0	0
181	218	168			0	0	0
20	12	87.5			0	0	0
14	10				0	0	0
13	15	196			0	0	0
					0	0	0
26	14	414	25	226	0	0	0
12	12	825			0	0	0
					0	0	0
17	25				0	1	0
64	58				1	0	0
12	11	61			0	0	0
6	8	425	19	544	0	0	0
		55	25	234	0	0	0
					0	0	0
11	7		14	568	0	0	0
					0	0	0
14	14	586	26	311	0	0	0
18	12	203	16	426	0	0	0
26	24	251	10	334	0	0	0
			12	356	0	0	0
12	10				0	0	0
35	36	256	20		0	0	0
16	16	980	11	563	1	0	0
24	14	226	23	271	0	0	0
14	7	719			0	0	0
14	9	418		374	0	0	0
36	32	42	90	2666	0	0	0
20	46	675	66	656	0	0	0
15	11	125	65	121	0	0	0
13		61			0	0	0
21	10	197	60	445	0	0	0
					0	0	0

18	18	152	30	827	1	0	0
13	8	474	14	55	0	0	0
14	10	592		738	0	0	0
29	29	327	31	1200	0	0	0
13	12	82	23	389	0	0	0
18	17	439			0	0	0
26	17	154	39	820	0	0	0
32	19	310	29	355	0	0	0
18	8	232	45	624	0	0	1
20	24	433	47	520	0	0	0
4.6	16	580	22	315	0	0	0
28	14	485	30	225	1	0	0
19	16	673	17	410	0	0	0
22	12	175	31	183	0	0	0
	16	164	16	638	0	0	0
16	12	350	10	33	0	0	0
12	10	401	20	207	0	0	0
33	40	350	41	665	0	0	0
15	10	51.5	44	674	0	0	0
19	10	250			0	0	0
20	20	225	20	76	0	0	0
15	10	548.8			0	0	0
28	17	70	17	291	0	0	0
13	12	400	17	89	0	0	0
24	20	206	20	828	0	1	0
30	50	1020			0	1	0
50	48	528			0	1	0
8	4				0	0	0
16	12	72			0	0	0
11	7	280		101	0	0	0
29	126	178	23	354	0	0	0
12	7	366	25	285	0	0	0
31	28	243	32	152	0	0	0

1	18				0	0	0
40	36	449			0	1	0
			95	877	0	0	0
					0	0	0
9		1200			0	0	0
22	13	56	21	53.3	0	0	0
45	29	956			0	0	0
		180	44	282	0	0	0
	16	450			0	0	0
15	13	1160			0	0	0
22	10	144	20	278	0	0	0
24	16	200	19		0	0	0
38	12	121	55	2231	0	1	0
12	7	1151	17	50	0	0	0
8	10	324	24	540	0	0	0
19	10	755	35	322	0	0	0
21	15	722			0	0	0
11	7	103			0	0	0
11	9	822	34	227	0	0	0
12	10	520			0	0	0
15	9	299			0	0	0
15	8	384.5	19	263	0	0	0
23	16				0	0	0
23	18	140			0	0	0
10	6				0	0	0
11	7	780			0	0	0
11	6	784			0	0	0
16	10	9.4	10	70.6	0	0	0
	9				0	0	0
10	12	0	21		0	0	0
		632	14		0	0	0
12	10				0	0	1
13	9	244.3	6	99	0	1	0

11	6				0	0	0
14	7	1900			0	0	0
14	7	107	12	136	0	0	0
18	8	1100	17	172	0	0	0
70	70	550	65	1200	0	1	0
20	11	28			0	0	0
15	10	51.3	14	446	0	0	0
13	10	530			0	0	0
12	7	180	15	306	0	0	0
14	11	803			0	0	0